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THE UNIVERSITY OF ALBERTA

DESIGNING AN IN-SERVICE PROGRAM

by

A. Joy Finlay

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A THESIS

SUBMITTED TO THE FACULTY OF GRADUATE STUDIES AND RESEARCH

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE DEGREE

OF MASTER OF EDUCATION

DEPARTMENT OF ELEMENTARY EDUCATION

EDMONTON, ALBERTA

FALL, 1978

THE UNIVERSITY OF ALBERTA

FACULTY OF GRADUATE STUDIES AND RESEARCH

The undersigned certify that they have read, and recommend to the Faculty of Graduate Studies and Research, for acceptance, a thesis entitled Designing An In-Service Program

submitted by Audrey Joy Finlay

in partial fulfilment of the requirements for the degree of Master of Education.

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Date October 16, 1978

ABSTRACT

In-service education provides a fundamental means for improving the professional competence and confidence of educators at the instructional level. The purpose of this study was to determine the factors important in designing an in-service program for elementary teachers. A theoretical frame of reference was developed. Its value and practicality were tested during an in-service project to facilitate the implementation of a grade four environmental education unit of study.

A framework for designing in-service programs was developed as a synthesis of theory, method and research. Recognizing in-service education as a developmental process, three sequential phases were identified. The phases of orientation, expansion, and confirmation were described in relation to the steps of the decision making process. The developmental sequence was viewed as beginning with awareness, progressing through understanding and practice, to the sum-up and closure phase.

For ease in referencing the matrix of variables that influence the effectiveness of an in-service program, five categories were created. The category factors of readiness, participation, relevance, continuity, and feedback provided a useful framework from which to plan and monitor an in-service project.

Readiness referred to the climate or the degree to which an individual or system is receptive to the idea being introduced. Participation was described as involvement and referred to the method of

leadership by which individuals shared in the planning and the process of the in-service program. Relevance referred to the extent to which material and methods presented were meaningful to the classroom teacher. Continuity was characterized by its process orientation to providing an ongoing sequence of events connected by themes and follow-up. Feedback included evaluation and an ongoing appraisal.

The case study method was selected as a means of testing the practicality of an in-service design based on a three phase process approach and the five categories framework. Twenty grade four teachers were involved in four in-service sessions during the last half of the school year. The purpose of the in-service project was to facilitate the adoption of an environmental education unit on waste management. Consultant service and release time were among the resources provided. Teachers' comments, recorded group discussions, and observations noted, provided support to the interpretation and analysis of the data.

It was concluded that the framework model had served as a useful reference from which to operate. The results of the study indicated a high level of teacher satisfaction with the in-service program. The unit was implemented by all of the teachers involved. The decision to adopt the innovation was confirmed by the group's voluntary commitment to encourage and assist other teachers in the use of the unit.

The study provides insight into the planning and the process of in-service development at the instructional level. The case study provided empirical evidence from which to compare and contrast the theoretical generalizations represented in the framework for operation.

Of the best leaders

The people only know that they exist;

The next best they love and praise;

The next they fear;

And the next they revile.

When they do not command the people's faith

Some will lose faith in them,

And they resort to recrimination!

But of the best, when their task is accomplished,

Their work done,

The people all remark,

"We have done it ourselves."

Lao-Tze (ca. 600 B.C.)

(Henry, 1957, p. 157)

ACKNOWLEDGEMENTS

During this project I have been very conscious of the valuable help and encouragement that I have received from a great many people. In particular, special thanks are extended to Dr. Don Massey for his guidance and assistance throughout this study. Appreciation is expressed to committee members Dr. Joan Kirkpatrick and Dr. Harvey Scott for their interest and involvement in this study.

I am grateful to my teacher colleagues for their enthusiastic participation in the program; and to the Edmonton Public School System for providing the opportunity to conduct a project of this nature.

This study was nurtured by the thoughtful help and care offered throughout by family, friends and fellow graduate students. Heartfelt appreciation is extended to Cam Finlay; and to Rhonda, Warren and Brett who were very much involved in the process of developing and producing this thesis.

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CHAPTER I

THE PROBLEM AND ITS SETTING

> In our ever-expanding world, the horizons extend from the classroom, across town and into the country until now man is knocking on the surface of the moon. It is not enough for children to remain in the classrooms and look out at the world. They must directly experience some of the excitement, pressures and problems of the world of reality.
>
> Bill Stark

Introduction

There is one truth about our world that remains a constant: the world is always changing. The history of mankind reflects the ways we have responded to the challenge of change; how we have purposefully or unwittingly initiated change; and how we have attempted to understand the complexity of change processes.

In the last two decades there has been an increasing awareness of some of the changes in the environment and their implications for better or for worse. The explosion of knowledge in our technical and social world has prompted extensive projects of revision and innovation in educational materials and practice. Additional to the impact of new knowledge in content areas is a response to a growing concern for environmental quality, resource depletion, and the ultimate issue of human survival. The basis for world wide environmental education is stated in The Belgrade Charter, unanimously adopted at the United Nations

Educational, Scientific, and Cultural Organization's Environmental Education Workshop.

> We need nothing short of a new global ethic. An ethic which espouses attitudes and behavior for individuals and societies which are consonant with humanity's place within the biosphere - which recognizes and sensitively responds to the complex and ever-changing relationships between man and nature and between man and man. (Belgrade Charter, 1975, p. 57)

This global statement was preceded by numerous events and efforts in the early '70's to establish environmentally relevant programs in the schools. A draft position paper of the Alberta Department of Education that was presented at the first Alberta Conference on Environmental Education in May, 1974, indicated that environmental education must be given high priority in terms of policy and program development, dissemination, and implementation. Examples of the department's efforts to strengthen environmental education in the schools included reference to changing the emphasis in Science and Social Studies programs. However, the opportunities that exist in present curriculum "are often not used for such reasons as: lack of teacher background and inaccessibility of, or failure to use, suitable and relevant literature . . . " (Hawley, 1975, p. 35).

Formal education has responded in varying degrees to the challenges of our changing world. Efforts in environmental education have produced supplementary materials, new curriculum guidebooks, activity programs and teacher training, mainly on an ad hoc basis. The complex process of teaching and learning has been influenced by the concerns of this age. The environmental educator faces a challenge of fulfilling

two needs--the need for environmental quality and the need for continued improvement in education. In the present generation, students may be as concerned as their teachers and, through television and other media, can be knowledgeable of current problems. "This requires a new learning-teaching style," a more informal instructional setting conducive to cooperation and problem-solving approaches to learning (U.S. Department of Health, Education and Welfare, 1971, p. 27).

Statement of the Problem

In-service education provides one way to assist teachers in rising to the challenges of teaching environmental education. It serves a dual purpose--that of subject matter understanding and improving the practice of teaching. By its nature and function in-service education is a process for planned change.

This study is an inquiry into in-service practice. The purpose of the study is to determine the factors important in designing in-service programs and to devise ways of applying these factors to an in-service program for teachers. Research data is provided through a case study approach.

The Setting of the Study

The opportunity for this study was provided when it became the responsibility of the writer, as a curriculum consultant, to plan and conduct an in-service program within the Edmonton Public School System. The purpose of the in-service program was to facilitate the adoption

of locally developed environmental education units of study by elementary teachers.

The inquiry that is the focus of this project grew out of a concern about the limitations of conventional in-service sessions that serve as "by-products" and "fringe benefits" to curriculum developments. A far-reaching challenge was provided for exploring unrealized potential of in-service education as an essential part of improving education as a whole. The immediate challenge appeared two fold--to assist teachers in developing competencies in the area of teaching the environmental education unit; and to build confidence in the art of creating learning environments where students are encouraged to investigate their surroundings in discovery and problem situations.

A search to find answers to the many unanswered questions related to the nature and function of in-service education was begun. To date, comprehensive studies of the factors involved in in-service projects designed to facilitate the adoption of instructional material in environmental education do not seem to exist. Consequently, Rogers and Shoemaker's (1971) conceptual framework based on the elements of diffusion and a classification of influences that affect the adoption of an innovation, was adapted as a base from which to operate. The paradigm presented by Rogers and Shoemaker had proven useful in other recent studies of planned educational change (Brekke, 1977; Crowthers, 1972; Meropoulis, 1978).

Thus, in addition to the immediate need to identify the variables involved and to choose appropriate strategies for in-service

programs, this study recognized a need for greater understanding of the in-service process and its potential in facilitating educational change.

Definitions

In-Service Education: This term is used to denote planned professional development of instructional staff members as professional practitioners.

An emphasis is placed on the recognition that professional development is planned. Although teachers are usually the direct focus of in-service activities, instructional staff includes librarians, principals, and other members involved in school programs. In-service education is distinguished from pre-service education by time and sequence. A distinction is made between "in-service education" and "supervision" which is broader in context (Harris & Bessent, 1969, pp. 1-2).

Environmental Education: The definition used in this study is that adopted by the Environmental and Outdoor Education Council of the Alberta Teachers' Association.

> Environmental education is that education in which the goals are development of:
> a recognition of human interdependency with other life;
> a sense of responsibility to maintain the environment in a manner fit for life;
> an aesthetic appreciation of the environment, including its multitude of interrelationships, interdependencies, and settings. (p. 1)

The Study Unit: This term refers to the teacher's resource

booklet, "Something From Nothing", a grade four environmental education unit focusing on waste resources. It is the innovation in the study.

Purpose of the Study

The purpose of this study was to determine the important factors involved in designing an in-service program through a case study approach.

To achieve this purpose, the study involved the following tasks:

1. Identifying variables that influence the nature and function of in-service education.
2. Categorizing the variables according to a composite model.
3. Designing an in-service program that attended to the variables.
4. Implementing an in-service program for elementary teachers within the framework identified.
5. Providing for on-going appraisal of effectiveness of design employed.

Significance of the Study

To the Local School System

The initial aim of in-service education is to assist teachers in the instructional process. The ultimate beneficiaries are the students they teach. This study will contribute insight into planning toward the professional development of the teachers involved in in-service programs conducted within the local school system. The development and outlining of a planning methodology should prove to be of practical value to lead-teachers, consultants and supervisors in determining

in-service procedures.

To Educational Research

It has been claimed the tools for change are and always have been at hand; but we must learn to recognize and use them (Terry, 1971). This study contributes a synthesis, not yet evident in research, of in-service practice and change process theory. A stronger conceptual understanding of how ideas spread from their source to the potential adopter, of the factors affecting the decision to adopt, and the role of in-service education in facilitating adoption, seem to be necessary to planning change in education.

The tendency in research has been to consider the development and the consequence phases of an innovation, neglecting the phase in between. This study focuses on the implementation phase and may contribute to empirical evidence toward closing the gap between what is developed (curriculum) and what is effectively put to use (practice).

Limitations of the Study

The focus of this research is on determining the factors in in-service education that influence the rate of adoption, and on how to, in view of these factors, implement an in-service program related to environmental education. However, it is not the intention to put forth a case for environmental education, nor to present an in-service format applicable to all teacher training. The practical focus will be on elementary programs of a local nature. The theoretical framework relates to facilitating change in the instructional process. Other

aspects, such as administrative, political and monetary, though of no less significance, are not included in the scope of this project.

Assumptions

A basic assumption that underlies this study is that in-service programs have a potentially positive influence on the adoption of the innovation involved. Also, it is assumed that the greater the teacher's satisfaction with the in-service, the more positive the influence. Due to the nature of the unit of study being introduced, it was assumed that teachers who volunteered to participate in the in-service program did so because of their interest and commitment to environmental education in the schools.

Organization of the Thesis

The problem and its setting has been introduced in the first chapter. The study has several phases that constitute the chapters that follow. The first phase involved an examination of the literature and research to identify components and influences related to in-service education. These factors were combined to provide the context around which an in-service program was developed.

In the next phase strategies were selected and devised for their appropriateness to the concept of in-service education as a facilitating process in the adoption of an innovation. This implementation phase is reported in detail as a case study.

The third phase addresses the question of determining the

practicality of the in-service program implemented. Appraisal is based on group discussions, taped proceedings, individual written reactions and informal ratings. Finally, a summary of the study in all its phases is provided.

Summary

This chapter provided a brief overview of the setting in which the problem occurs. A statement of the problem was made and selected terms were defined. The significance of the study to the local school system and to educational research was posed. Limitations and assumptions were also considered. The organization of the thesis was outlined.

CHAPTER II

REVIEW OF THE LITERATURE AND RELATED RESEARCH

Introduction

> The essential purpose of the public schools is to educate students to function in society. That skill can be taught only by teachers who are aware of the great and small changes within the immediate community and the wider world. Teacher training should be a continuing, never-ending process, closely related to the reality of the life of children and families. (Spillane and Levenson, 1976, p. 439)

In this chapter selected literature is reviewed in terms of the following topics:

1. Literature on planning change.
2. In-service programs.
3. Research related to in-service education.
4. Models for participation.
5. The context for planning an in-service program.

The literature reviewed and discussed in this chapter provides the conceptual basis within which the in-service program of this study was planned and implemented. The method of planning the in-service program was one of synthesis; a synthesis of theory, method and purpose presented by several authors and practitioners. Writings in publications of singular significance such as those by Rogers and Shoemaker, and Osborne and Bowling have been selected for detailed review.

Literature on Planning Change

Literature on educational change is massive. Havelock (1971) identified over 4,000 studies in the area of innovation, and estimated that he had probably located only half of them. Within the recent literature there are many expressions of concern about the need to effect change in education. Toffler (1970) commented: ". . . our schools face backward toward a dying system, rather than forward to the emerging new society" (p. 399). Rogers and Shoemaker (1971) stated: "Although it is true that we live more than ever before in an era of change, prevailing social structures often serve to hamper the diffusion of innovations" (p. 1). The change process is all encompassing. The variety of terms used by the writers in the literature on change including communication, diffusion, innovation and adoption is confusing in itself. It becomes a real challenge to delineate those aspects and stages within the change process that may be relatively useful to consider in teacher education.

Harris and Bessent (1969) emphasized a distinction between planned change, a goal of in-service education, and unplanned changes that might be thought of as "organizational drift". Rogers and Shoemaker (1971) categorized social change according to the source of change. When the source of the new idea is from within the social system, it is termed "immanent change". When the source of the new idea is from outside the social system, it is referred to as "contact change". The two categories of immanent and contact change are further

delineated according to whether the need for change has been recognized internally or externally to the social system involved in change. (p. 8)

Since the focus of this study is to inquire into planning in-service programs to facilitate change, this review will relate to literature concerning change of an immanent nature. The writings reported in this section have been selected for their relevance to developing a context to the problem of designing and implementing a program of in-service education within a specific school system.

The Diffusion Process

Rogers, more than any other writer, has attempted to synthesize information from diverse publications and to develop standardized terminology for dealing with the diffusion process. His first book, Diffusion of Innovations (Rogers, 1962) was followed by a second edition, Communication of Innovations: A Cross Cultural Approach (Rogers and Shoemaker, 1971). These works provide a conceptual framework for examining the diffusion process.

Based on a synthesis of findings from more than 1,500 different publications, Rogers and Shoemaker (1971) presented a series of generalizations about the diffusion process. Their thesis was that communication is essential to social change (p. 6). Diffusion is a type of communication by which innovations spread to the members of a social system; the spread of a new idea from its source to its ultimate users. They defined four elements considered crucial to the diffusion process:

1. the innovation which is

2. communicated through certain channels
3. over time
4. among members of a social system (p. 18).

Attributes of the innovation. An innovation is an idea, practice, or object that is perceived as new by an individual.

Rogers and Shoemaker (1971) emphasized that it is the receivers' perception of the innovation and its attributes, not the perception of the experts or change agents, which affect their rate of adoption:

> Like beauty, innovations exist only in the eye of the beholder. And it is the beholder's perception which influence the beholder's behavior. (Rogers and Shoemaker, 1971, p. 138)

The five most important characteristics derived from their research are summarized as follows:

1. Relative advantage is the degree to which an innovation is perceived as better than the idea it supersedes. The greater the perceived relative advantage of an innovation, the more rapid its rate of adoption. Of 43 studies surveyed by Rogers and Shoemaker, 67% supported this generalization.
2. Compatibility is the degree to which an innovation is perceived as being consistent with the existing values, past experiences, and needs of the receiver. Of 27 studies surveyed, 67% supported the generalization that perceived compatibility is positively related to rate of adoption.
3. Complexity is the degree to which an innovation is

perceived as difficult to understand and use. Of 16 studies surveyed, 56% were negatively related to rate of adoption.

4. Trialability is the degree to which an innovation may be experimented with on a limited basis. New ideas which can be tried on the installment plan will generally be adopted more quickly. Of 13 studies surveyed, 69% were positively related to rate of adoption.
5. Observability is the degree to which the results of an innovation are visible to others. The easier it is for an individual to see the results of an innovation, the more likely he is to adopt it. Of 13 studies surveyed, 78% supported this generalization. (Rogers and Shoemaker, 1971, pp. 22-23)

Communication channels. The means by which a message gets from a source to a receiver are also important. The degree to which the type of communication channel is important is related to the receiver's stage in the innovation-decision process. Mass media channels are relatively more important at the knowledge function stage for most rapid transmittal to large audiences. Interpersonal channels are relatively more important at the persuasion function stage in the innovation decision process; that is, if the objective is to persuade the receiver to form a favorable attitude toward the innovation or to try it (Rogers and Shoemaker, 1971, p. 255).

Time and the stages in the innovation-decision process. Rogers (1962), in the first major work on change processes, identified five main stages in the adoption process: awareness, interest, evaluation, trial and adoption. Rogers and Shoemaker's (1971) revised model proposed four stages through which an individual passes from first knowledge of an innovation to a decision to adopt or reject and to confirmation of this decision:

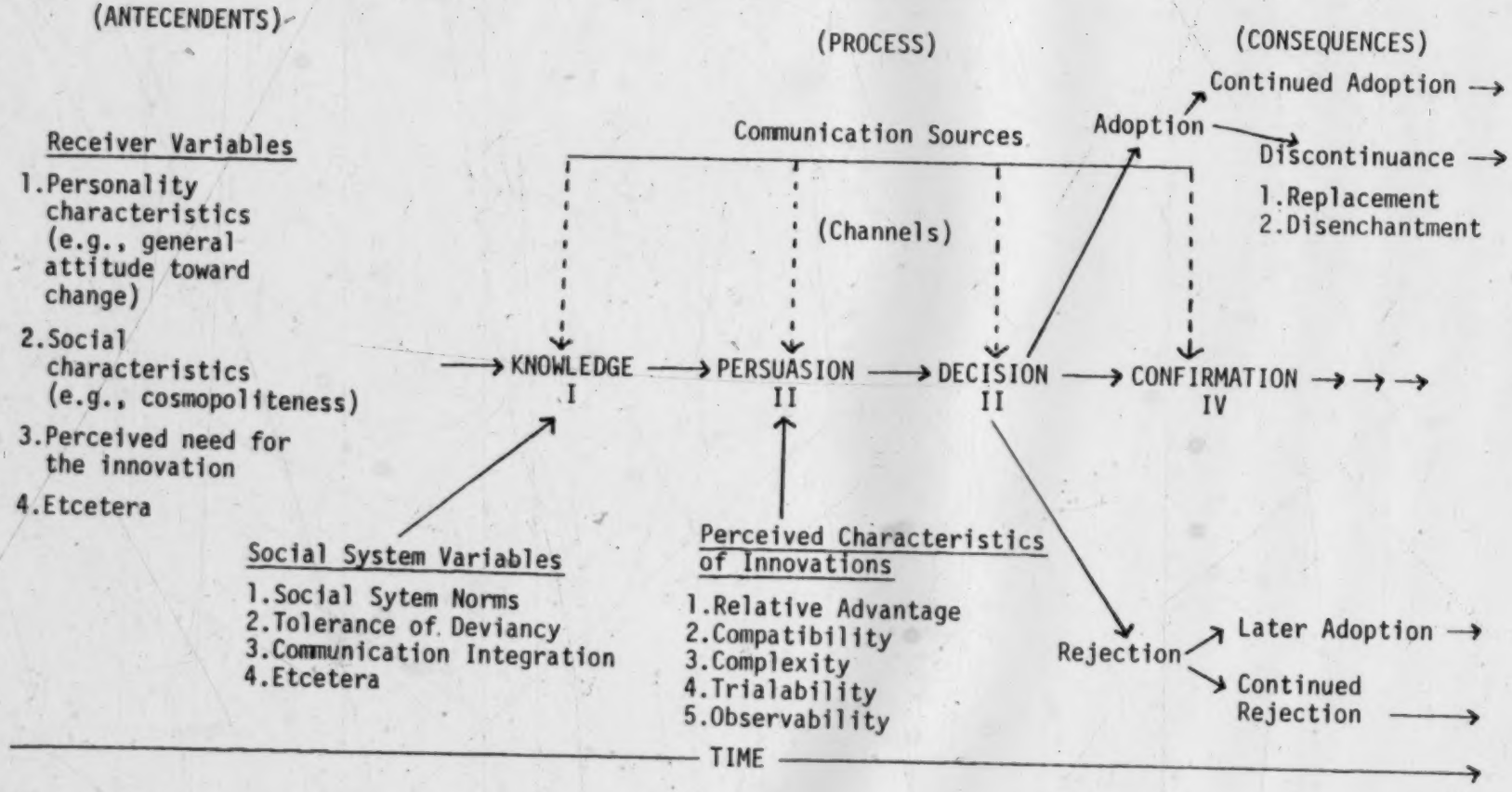
> Knowledge. The individual is exposed to the innovation's existence and gains some understanding of how it functions.
>
> Persuasion. The individual forms a favorable or unfavorable attitude towards the innovation.
>
> Decision. The individual engages in activities which lead to a choice to adopt or reject the innovation.
>
> Confirmation. The individual seeks reinforcement for the innovation-decision he has made, but he may reverse his previous decision if exposed to conflicting messages about the innovation. (Rogers and Shoemaker, 1971, p. 103)

The length of time required by an individual to pass through the innovation process is influenced by a number of variables (Figure 1), among them an individual's innovativeness, the individual's attitude toward change.

Innovativeness is the degree to which an individual is earlier in adopting new ideas than other members of his system (Rogers and Shoemaker, 1971, p. 27). Obviously, all individuals do not adopt an innovation at the same time. They adopt in an ordered time sequence, and they may be classified into adopter categories on the basis of when they first begin using a new idea (Figure 2). Innovativeness has become the main dependent variable in diffusion research, mainly

Figure 1

Paradigm of the Innovation-Decision Process

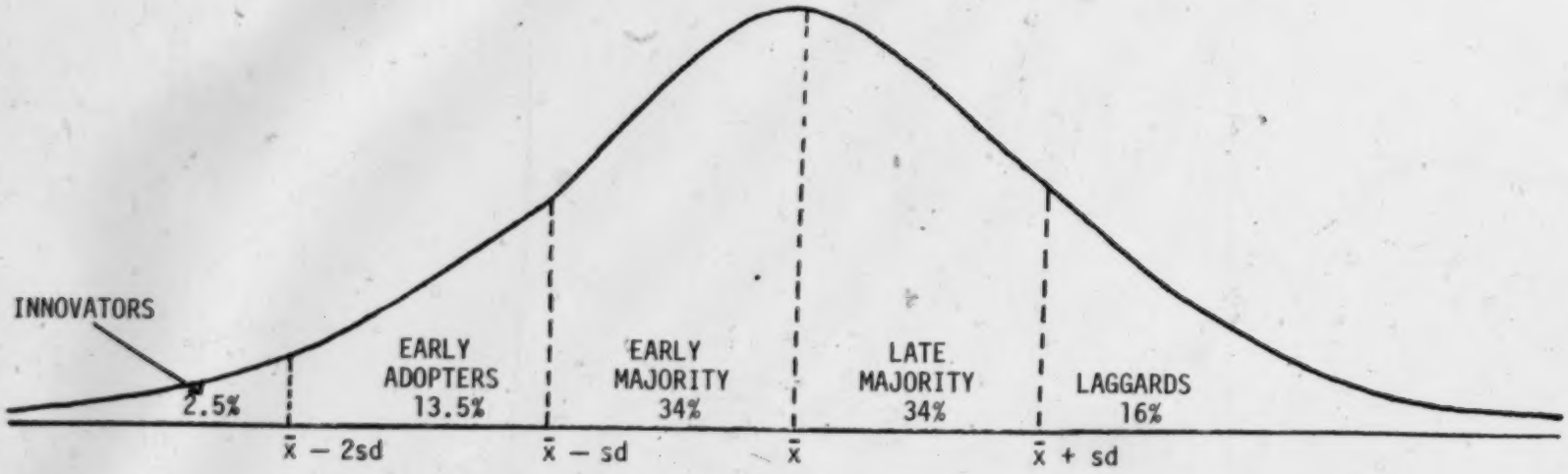


*For the sake of simplicity we have not shown the consequences of the innovation in this paradigm but only the consequences of the process.

Rogers & Shoemaker, 1971, p. 102

Figure 2

Adopter Categorization on the Basis of Innovativeness



The innovativeness dimension, as measured by the time at which an individual adopts an innovation or innovations, is continuous. However, this variable may be partitioned into five adopter categories by laying off standard deviations from the average time of adoption.

Rogers & Shoemaker, 1971, p. 182

because innovativeness is a key objective of change agencies and because innovativeness is the best single indicator of adoption and behavioral change.

Adopter categories as ideal types: To facilitate comparisons and explain the ways in which people respond to change, Rogers and Shoemaker (1971) have defined five ideal-type adopter categories in the innovativeness continuum.

1. Innovators are characterized by their venturesomeness, a willingness to take risks and an eagerness to try new ideas. They are less bound by the traditions of the system and tend to have numerous contacts beyond the local circle of peers.
2. Early adopters are highly respected members of their social system and often serve as role models and opinion leaders for their peers. Potential adopters look to early adopters for advice and information about the innovation. Change agents look to them to speed the diffusion process.
3. Early majority are termed deliberate and consider an innovation for some time before attempting it. They adopt new ideas just before the average member of the social system and are therefore an important link in the success of the diffusion process.
4. Late majority are skeptical and do not adopt until they feel the weight of peer pressure in their social system. They are not committed to the innovation and are quick to

discard it if results are not obvious.

5. Laggards, the last to adopt an innovation, are tradition-bound and oriented to the past. They resist change, sometimes adopting an innovation after it has become obsolete.(pp. 183-191)

Research findings to determine the relationship of characteristics of adoptive categories to innovativeness were organized under three headings: 1. socioeconomic status, 2. personality variables, 3. communication behavior. Most of the independent variables identified were positively related to innovativeness. Thirty-two generalizations, in summary, indicated that:

> The relatively earlier adopters in a social system tend to have more education, a higher social status, more upward social mobility . . . greater empathy, less dogmatism, greater ability to deal with abstractions, greater rationality, and more favorable attitudes toward change, risk, education, and science. They are less fatalistic and have higher achievement motivation scores and higher aspirations for their children. Earlier adopters have more social participation, are more highly integrated with the system, are more cosmopolite, have more change agent contact, have more exposure to both mass media and interpersonal channels, seek information more, have higher knowledge of innovations, and have more opinion leadership. They usually belong to systems with modern norms and to well integrated systems. (Rogers and Shoemaker, 1971, pp. 195-196)

The differences among the categories suggested that change agents need to employ different strategies or change techniques with each group.

Rate of adoption is the relative speed with which an innovation is adopted by members in a social system. It is a measure of the

system, not the individual; a measure of the cumulative effect of individual's perceptions of an innovation and disposition to change. Additionally, the nature of the social system itself may exert a powerful influence on the individual and impede or facilitate the rate of adoption. Generally, those systems typified by modern, rather than traditional norms will have a faster rate of adoption.

Members of a social system. A system's social structure, including its norms, social statuses, and hierarchy, has certain effects on the behavior of individual members and the rate at which new ideas are diffused and adopted.

The social system is a collectivity of units which are functionally differentiated and engaged in joint problem solving with respect to a common goal (Rogers and Shoemaker, 1971, p. 28). It is this sharing of a common objective that binds the system together. In applying this definition in this thesis project then, a school system may be viewed as a social system; with teachers as members or units, and specific schools as subsystems of the social system, each being functionally differentiated from every other member.

Norms, the established patterns of behavior for members of a social system, define the range of permissible behavior and serve as a standard for the individual members (Rogers and Shoemaker, 1971, pp. 30-31). Opinion leaders influence other individuals' attitudes or overt behavior informally through interpersonal communication networks. Opinion leadership is earned and maintained by the individual's technical competence, social accessibility and conformity to the system's

norms. It contrasts with formal leadership, which is exercised by virtue of the formal office an individual holds. Because of these characteristics, opinion leaders often serve as models for the innovation behavior of their followers. They may facilitate or impede adoption of an innovation.

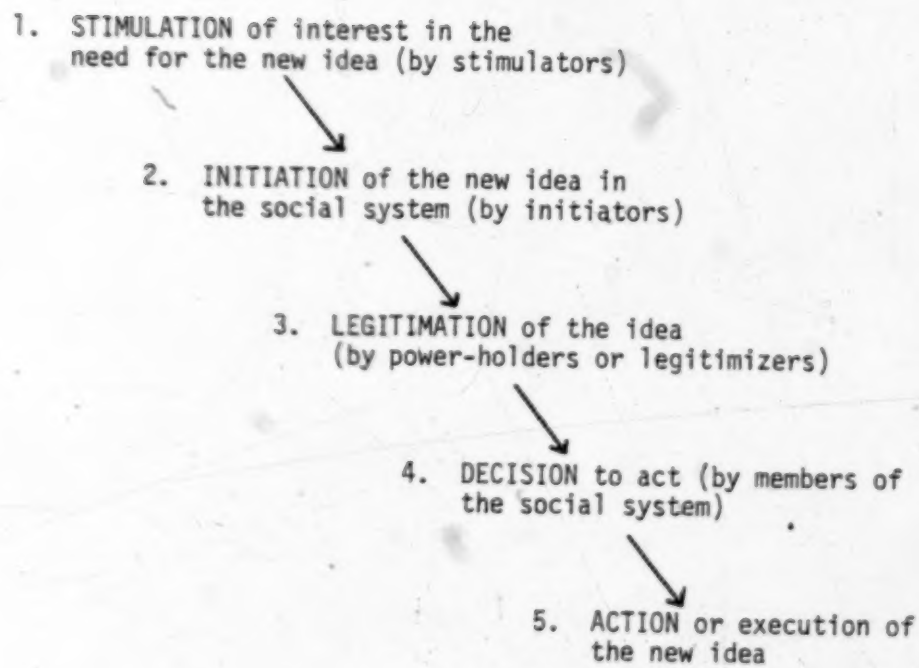
Compared to followers, opinion leaders have greater mass media exposure, more cosmopoliteness, greater change agent contact, greater social participation, higher social status and more innovativeness (Rogers and Shoemaker, 1971, p. 225).

Another important characteristic of social systems is the way in which innovation decisions are typically made. Rogers and Shoemaker (1971) designate three types of innovation-decisions.

1. Optional decisions are made by an individual independently of decisions made by other members of the social system.
2. Collective decisions are made by members of the social system by concensus. The more individuals involved in making a collective decision, the slower it will proceed, for the collective decision process is basically composed of a multitude of individual decisions by group members. Rogers and Shoemaker presented a simplified synthesis of the steps involved in the collective decision making process (Figure 3). The close parallel between the steps in collective innovation-decision making and the function of the individual innovation-decision process described earlier, is very interesting.

Figure 3

Paradigm of the Collective Innovation Decision-Making Process


1. STIMULATION of interest in the need for the new idea (by stimulators)
2. INITIATION of the new idea in the social system (by initiators)
3. LEGITIMATION of the idea (by power-holders or legitimizers)
4. DECISION to act (by members of the social system)
5. ACTION or execution of the new idea

The collective innovation decision-making process is usually conceived as five or more steps or subprocesses from original realization of a need for the new idea (stimulation), to final action or carrying out the new idea in the social system. This conception has mainly evolved from research on community decision-making (see Beal and others, 1964, p. 7), but it should be generally applicable to most other types of social systems, such as bureaucracies, committees, and families.

Rogers and Shoemaker, 1971, p. 276

Rogers and Shoemaker indicated there is extensive empirical support for generalizing that satisfaction with a collective innovation-decision is positively related to the degree of participation of members in the decision. Of five studies, surveyed by Rogers and Shoemaker, there was 100% support of this generalization. A note of caution was that:

> We should remember that the individual's perceived participation is more important in explaining his satisfaction with collective decisions than is his objective participation (that is, his degree of participation as judged by others). (Rogers and Shoemaker, 1971, p. 286)

The discussions and generalizations posed by Rogers and Shoemaker about the collective innovation-decision process have a high degree of relevance to the decision-making methods employed in this in-service project.

3. Authority decisions are imposed upon the individual by someone in a superordinate power position. The fastest rate of change results from authority decisions, although they are more likely to be circumvented and may lead to a high rate of discontinuance of the innovation.

In addition, there are contingent innovation-decisions, made possible only after a prior innovation-decision has been made. This type is essentially a sequential combination of two or more of the three types of innovation-decisions.

Utility of Diffusion Research

The chief limitation of diffusion research in general is that most studies have focused on the individual as the unit of adoption and have given little attention to the role played by relationships among individuals and by organizational factors in the change process. Rogers and Shoemaker's study emphasized a recent general shift from studying the individual units to an examination of the process involved. In taking a holistic approach, characteristics and interrelatedness of the various elements, including individuals and their perceptions, are factors to be considered in the diffusion process.

Diffusion research focuses on bringing about overt behavior changes; the adoption or rejection of a new idea. Agents planning change need to have knowledge of the innovation, the new idea itself; and they need to understand the factors that influence the spread of new ideas from their source to potential receivers; that is, to understand a diversity of factors that affect the adoption of innovations. Changes occur at the individual level and the system level, each being closely interrelated with the other. Innovation diffusion is a slow process. In-service education is seen as one of several means for diffusion of an innovation to bring about change in teacher behavior.

In-Service Programs

The need for "better" programs of in-service education has been widely acclaimed in the literature related to professional growth in education. Hass (1957) demonstrated the need for in-service education

in a discussion on factors such as the rapid accumulation of academic and professional knowledge, the rapid cultural changes which characterize modern times, and the importance of making it possible for excellent teachers to make use of their creative abilities (pp. 13-34).

Taba (1965), with reference to the profound changes in education, and the serious gap between what teachers are doing and what is expected of them, stated that:

> In-service training needs to play a much more important and different role than it has in the past. It needs to take on a double function: that of implementing changes generated elsewhere and of being an agent of change in particular school systems. (Taba, 1965, p. 464)

The discrepancies between the intent and the effect and especially between the claims of what-is and what-ought-to-be are disconcerting.

> One might assume . . . that something perceived to be as important as in-service education of teachers would be very well done. If we are to believe reports of hundreds of teachers, however, along with the results of some research, we would have to conclude that in-service programs are very frequently not well done, and for the most part are ineffective in changing teacher behavior over any length of time. (Jarolimek, 1970, p. 329)

With emphasis on the need to revise current practices, Taba suggested:

> The most difficult task of in-service training lies in helping teachers to shed their deep-seated reverence for "overcoming" detailed facts, to develop a capacity to identify large ideas, and to use facts selectively and economically to develop or elucidate these ideas. (Taba, 1965, p. 466)

Among the implications Taba discussed, there is a caution that providing content background to teachers without a simultaneous effort at instructional implementation does not assure that the background will be used in instruction, except perhaps in transmitting to students this knowledge in practically the same way in which it was received. An example is cited of a teacher who attempted to "put over" the idea of a "market system" to second graders after attending a workshop on economics (Taba, 1965, p. 475).

On the other hand, instructional techniques and skills presented to teachers in isolation from the concepts of the content areas or the rationale for using them easily degenerate into gimmicks and gadgets.

An oversimplification of what teaching is all about may be a significant obstacle to planning in-service training. Taba elaborated that too often workshops, institutes, and consultant services tend to be "one-shot" affairs, offered without sufficient analysis of the problems and the needs they are to serve, and without adequate follow-up to capitalize on what is offered.

In-service training might be more effective if continuity was provided for. Teachers learn new ways of thinking and new skills developmentally, as do students. The greater the changes in teaching strategies, the greater the need for in-service training to include the opportunity and time to consider and practice sequential steps involved in producing such changes.

According to Taba, prolonged training of smaller groups is about the most economical and prudent thing to do because tasks can be

differentiated, and theoretical background can be combined with practical application, thus eliminating the gap between theory and practice.

Further advice includes the need for consultants to cultivate self-sufficiency on the part of the local staff. To be no longer needed would be a sign of success.

Guidebooks and Guidelines

Many specific factors considered important for designing in-service programs are stipulated as guidelines in a number of brief publications and professional journals (Bennett, 1975; Engleson, 1975; Fox et al., 1967; Mackay, 1964; Rubin, 1971). Harris and Bessent (1969) claimed that:

> Reports of practices are sketchy and tend to be reported as local "success" stories rather than as objective descriptions. Good case studies are a rarity and to the author's knowledge a handbook describing practices in any extensive way simply does not exist. (Harris & Bessent, 1969, p. 1)

It is interesting to note that there is now at least one handbook - this very book from which the quotation was taken. Harris and Bessent's In-Service Education has become a frequent reference in the literature related to in-service education since 1969. The fact that it is now out-of-print leads to some interesting speculation about the demand for such a handbook. Prior to 1969, The 56th NSSE Yearbook (Henry, 1957) was an important reference. Recently An In-Service Handbook for Mathematics Education (Osborne, 1977) has been published. These are three works that represent significant and comprehensive

efforts of a few trail blazers in in-service education over the past two decades. The two more recent handbooks will be included in subsequent discussions in this chapter.

In the area of environmental education there are very few descriptions of representative in-service programs from which to pattern procedures or techniques. For example, representative in-service programs in environmental education identified by Engleson referred to techniques and approaches in very general terms. Pre- and post-test evaluations, when reported, indicate general results and do not include specific information on what works and what does not.

Through an Educational Resources Information Centre (ERIC) search the final report of an environmental education leadership development project was obtained for review (Gallagher, J.J., 1975). The project was organized into ten workshops, each one described in detail in the book. During the last fifteen minutes of each workshop the participants evaluated the day's agenda. Evaluations provided by the participants indicated general acceptance of all the activities which ranged from lectures, laboratory activities, simulations, values clarification procedures, information gathering and field trips. Teachers indicated they especially enjoyed in-service sessions which contained interactive strategies and individual time for learning. They did not want to make choices from optional sessions, preferring to attend all workshop activities. The provision of coffee and the ensuing socializing enhanced the workshop experiences.

The project was considered a success on the basis that teachers

and school districts adopted the idea of environmental education as being a viable part of the school curriculum. A further measure of success included a multiplier effect whereby participants began teaching other teachers.

A Guide to Planning and Conducting Environmental Study Area Workshops, published by the National Education Association presents seven practical guidelines for designing workshops:

1. Actively involve participants.
2. Design activities that require use of all the senses.
3. Vary activities and provide options.
4. Consider participants' different levels of readiness for activities.
5. Determine what prospective participants want to gain from the workshop. Involve them in planning for it.
6. Design activities through which participants discover for themselves.
7. Plan activities to help participants get acquainted and feel at ease. (p. 10)

Step by step suggestions are made for involving participants in the development of five conceptual strands. The attributes of this innovation approach to environmental education have been perceived favorably by classroom teachers sporadically throughout North America. It is one of the better known programs in environmental education, usually referred to as N.E.E.D. (National Environmental Education Development), and is used extensively in the U.S. National Parks.

The literature includes much advice on various aspects and mechanics of conducting in-service programs. A recurring recommendation

for the development of in-service education emphasizes the teacher's involvement in his own learning. Harris and Bessent, 1969; Mackay, 1964; Moir, 1970; Osborne, 1977; Rubin, 1971; and Lippitt and Fox, 1971, emphasized that in-service activities should assist the teacher to develop his capacity for self-direction.

Partly because of the importance they attach to peer influence, and partly because of their respect for group processes, Lippitt and Fox strongly favored collective teacher education and a problem-solving approach. They believe, if efforts to change teacher behavior are to succeed, there must be a framework to provide for continuity, with appropriate sequencing of activities and support of change efforts. The "ingredients" for placing in-service training in the context of planned change within a social system included:

> Identifying needs for change.
> Designing action-research projects.
> Working with outside resource people.
> Diagnosing the learning climate.
> Serving as a member of a school change-agent team.
> Learning about innovations developed by other teachers or by national projects.
> Utilizing the resources of school systems personnel.
> Increasing interpersonal sensitivity to authority figures, peers, and students.
> Deriving implications for learning from research findings.
> Gaining support from colleagues.
> Sharing results with others. (Fox & Lippitt, 1971, p. 161)

These authors also claimed that a weakness in a large proportion of in-service training activities is that activities are selected without involving the participants in selection of topics or identification of needs, and without regard for levels of readiness or variety of expectations. Furthermore, the methods of most in-service

education provide little opportunity for using inquiry. There is an emphasis on pre-selected cognitive learnings with little or no integration of concepts with the affective and behavioral dimensions or for classroom application. Yet another deterrent to effecting change, observed by Fox and Lippitt, is that teachers enter the in-service program because of extrinsic motivations (for example, credit or promotion ambitions), which tend to support a learning role characterized by conformity and a minimal amount of initiative.

A problem-solving approach is viewed by Fox and Lippitt as having the greatest potential for changing the performance of teachers through in-service activities. This is the major approach presented and illustrated in the handbook by Harris and Bessent (1969).

Harris and Bessent based their laboratory approach to problem solving on "proven effectiveness". A number of findings from various studies and a consideration of the mistakes that have contributed to "the precarious reputation" of in-service programs, a rationale, format, and case examples of in-service programs are provided in the handbook. Although the authors noted some of the differences characteristic of the laboratory approach, their design fits many of the criteria specified in the literature on how-to-conduct in-service programs. Design elements include: involvement of the participant in solving a problem; simulation; feedback from participants; development of generalizations and implications for practice.

Although a planner may have difficulty finding material to serve as a guide in designing a program and selecting activities for

in-service education, a search of the literature does provide various suggested guidelines related to methods, purpose and procedures. The criteria and strategies advocated for in-service education have been formulated from experience and knowledge of educators involved in administration or study of such programs. Reports of examplary practices and case studies are indeed sketchy. There is a gap between perceptions of practice as-it-is and implications for the way it-ought-to-be.

Scope of In-service Education

Part of the problem in considering the effectiveness of in-service education may be inherent in the concept of in-service education and the diversity of activities and purposes that it encompasses. In its broadest definition in-service education includes a great range of activities aimed at the professional development of teachers. Even with the more limited definition as "planned activities for the instructional improvement of professional staff members" (Harris & Bessent, 1969, p. 2), in-service education may include a great variety of activities, among them: simply arranging for presentation by speakers presumed to be experts; or "one-shot" workshops and institutes sponsored by the school district; or professional development days conducted by curriculum consultants or supervisors. The effectiveness of these attempts at in-service education varies considerably depending on the strength of the individual making the presentation.

There appears to be an expectation that occurs consistently in the recent writings about the effectiveness of in-service education.

In discussions of the need for in-service education; or the shortcomings of in-service programs, or the strategies and techniques employed (or lacking), an underlying assumption appears to be that the function of all in-service education is one of facilitating change. On the other hand, schools and school systems are most often considered as essentially bureaucratic structures and the main role of their administration is not to promote change but to perform a maintenance function, to administer the "status quo". It would seem that in reality the function of in-service programs and specifically those within a school system, may not always be intended to facilitate changes. Perhaps this is a moot point, since the focus of this in-service study is to plan and implement an in-service program as a means for effecting change; and therefore it is entirely appropriate to assume that the goal of in-service education is to promote change. Further, in-service is a means to an end; the assumption being that change in teachers' behavior will ultimately lead to desirable changes in pupil behavior; and "this is after all the whole purpose of the school program" (Mackay, 1964, p. 65).

Although it is a significant and very visible aspect of planning for in-service education, there is much more than the selection of in-service activities at stake. It would be an oversimplification to consider that the effectiveness of in-service programs hinged only on considering the choices of appropriate procedures, techniques, facilities and resources. In the words of Eyler (1972), educators concerned with change have tended to confuse an event with a system.

For illustration, Eyler cites the first grader who confused his first day at school with an education; and the educator who points to a new text as adoption of an innovation (Eyler, 1972, p. 97). Likewise, the successful involvement of teachers in an in-service activity may provide a climate for facilitating change, but it is a single event in a complicated process of change; and in-service education is but one element, though an important one, in the complex system of innovation diffusion.

Research Related to In-Service Education

As noted in earlier references, the importance of in-service education has been widely described in the literature; yet research in the field is meager.

Harris and Bessent (1969, p. 4) commented that rigorous studies are rarely reported, forcing practitioners to speculate about mistakes others may have made. A recent publication of the National Council of Teachers of Mathematics (NCTM) is apparently one exception to this general statement. A detailed review of the publication An In-Service Handbook for Mathematics (1977) follows:

Research Project on Teachers' Perceptions of In-service Education

Research was conducted by NCTM to gain a better sense of the problems and perceptions involved in in-service education. The In-Service Handbook, edited by Osborne, is a direct result and product of the NCTM In-Service Project's survey in 1975 of 7,500 elementary

and secondary teachers in the United States.

Two initial surveys were conducted in 1974 by the NCTM's Commission on Education of Teachers of Mathematics. Sensing that teachers were dissatisfied with in-service education, the first project of the commission was a survey to determine mathematics teachers' perceptions on in-service education. The survey was limited to a sample of NCTM teacher members. A second project following from this first one, attempted to identify in-service programs that were perceived as helpful and an effort was made to determine what the critical variables in the designs of in-service programs were. An expansion of these two pilot projects resulted in the NCTM In-Service Project in which a more broadly based survey was conducted to sample representative public school teachers across the United States. The In-Service Handbook, a product of this project, includes some of the results and interpretations of the survey. Discussion included reference to observable results and statistical findings.

Characteristics of the teacher population surveyed were ascertained by questions included within the first section of the NCTM In-Service Survey questionnaire. Most respondents to the questionnaire indicated they had recent experience within the past two years upon which to base their judgements and opinions about in-service education.

Satisfaction With In-Service Education

Two questions (Numbers 4 and 29) of the 150 items on the questionnaire related to satisfaction and positive experience with in-

service education. Results showed 50% and 63.7% satisfaction by elementary teachers on these two questions. Secondary teachers indicated 37.2% and 53.8% satisfaction. Although these results imply a level of satisfaction that is questionable there were other results that indicated strong hope and faith in the potential of in-service education to serve the needs of teachers.

A suggestion made by Osborne and Bowling (1977) was that some of the current dissatisfaction with in-service may stem from its being oriented to teachers as they were in the 1950's and 1960's (p. 21). Three questions of the survey ascertained that teachers have a significantly better academic background than twenty years ago. With this sophistication has grown an expectation for a different level of in-service education as well as an increased sense of professionalism. Results on the question about a felt need to participate in in-service education showed 77.1% elementary and 80.2% secondary teachers did feel a need to participate in mathematics in-service education. The difference between satisfaction with in-service education and the felt need for in-service education is thought-provoking.

Complaints About In-Service Education

Thirteen questions were used to determine and rank complaints about in-service education. These questions and the results are listed in Table 1. Based on analysis of the data, the authors concluded that these gripes are very significant factors affecting the perceived success or failure of an in-service program (Osborne & Bowling, 1977, p. 31). The ranking of gripes showed that teachers want in-service

Table 1

Gripes About In-Service

Question Number	Gripe Statement	Elementary Percentage		Secondary Percentage	
		yes	rank	yes	rank
30.	It has not fit my needs in the classroom.	58.0%	1	65.5%	1
31.	I did not help select the topics.	42.7%	4	44.0%	5
32.	The leaders have not taught classes like mine.	42.0%	6	46.8%	4
33.	The program was poorly planned and disorganized.	30.1%	8	31.8%	8
34.	The program was too theoretical.	51.1%	2	47.0%	3
35.	Everything was old-hat; I had seen it all before.	29.3%	9	30.6%	9.5
36.	It was inconvenient; too far and at the wrong time.	27.7%	11	30.6%	9.5
37.	The program was so general it did not help in the teaching of math.	45.5%	3	52.4%	2
38.	The only reward was the personal element of self-satisfaction.	26.6%	12	29.7%	12
39.	The leaders had other things on their minds than my problems.	18.1%	13	25.4%	13
40.	Too much method and too little mathematics.	39.8%	7	35.7%	6
41.	My fellow participants were so bored and uninterested that it discouraged me.	28.3%	10	33.1%	7
42.	Materials used in the in-service were too expensive for practical classroom use.	42.5%	5	30.2%	11

Osborne and Bowling, 1977, p. 29-30

experience to be relevant to their specific classroom needs.

Participation in topic selection was also considered to be very important by teachers. Statistical analysis indicated many intercorrelations with gripes were significant. The gripe of not helping select the topic for in-service programs was significantly related to all but one of the other gripes.

Teachers' satisfaction with previous in-service education (question 4) and their positive experiences with it (question 29) were found to be related to their gripes. Those that had gripes responded negatively to the two satisfaction questions; and those who did not have a gripe responded positively to the satisfaction question (Osborne & Bowling, 1971).

Perceptions of What-is and What Ought-to-be

The second section of Osborne and Bowling's questionnaire consisted of forty nine statements about the way in-service education IS and OUGHT-TO-BE. Each statement required two responses based on teachers' perceptions of what-is and what-ought-to-be for in-service education. A large number of discrepancies became evident upon comparison between teachers' perceptions of current in-service practices, the "what-is" and their opinions of "what-ought-to-be". Each of the discrepancies were examined statistically to determine if the observed discrepancy was significant.

The largest discrepancy between the Is and the Ought occurred on the pair item directed to determining whether in-service programs

were designed specifically for teaching mathematics. This item correlated positively with question four on satisfaction with in-service. This may be interpreted to mean that teachers find in-service is too general and that it ought to be more specific.

Who Should Conduct In-Service

Three item pairs were related to who should conduct in-service programs (Table 2). The results indicated a preference by teachers for a person within one's own school to have the major responsibility for their in-service programs. The statistical tests indicated that teachers who were in a school system where in-service responsibility was taken locally were less likely to have a gripe that in-service was too general. These teachers were also more likely to be satisfied with their in-service experiences.

Teacher Participation

Participation in topic selection as an important factor was further substantiated in the results of the item concerning participation in topic selection. Forty-four percent of the elementary teachers and 35% of the secondary teachers indicated they participated in identifying topics for in-service education. Ninety-three percent of the elementary teachers and 92% of the secondary teachers indicated they ought to participate. Osborne and Bowling reported finding that elementary teachers who helped identify in-service topics were significantly more likely to have realized satisfaction (item 4) and have had a positive in-service experience (item 29) than those who had not.

Table 2

Who Should Conduct In-Service Programs

Question Number	Question	Elementary (lumped Agree percentages)		Secondary	
		Is	Ought	Is	Ought
57.	There is an individual in my building or in my school system responsible for inservice education in mathematics.	32%	84%	28%	83%
60.	In-service education programs are conducted by personnel within my school system.	64%	73%	54%	71%
55.	My school district depends on neighboring colleges and universities to provide the majority of opportunities for in-service education.	42%	52%	53%	50%

Osborne and Bowling, 1977, p. 37

Secondary teachers who had participated in topic selecton were about twice as likely to have had a positive perception of in-service experiences (item 29) than those who had not.

Organization and Format

From four questions addressing the problem of the format and organization of in-service education it was evident that short and to the point in-services were the most desirable. Analysis further substantiated the importance of the short-and-to-the-point characteristic of in-service sessions. Teachers who participated in short-and-to-the-point inservices were more likely to have positive in-service experiences (question 29) and satisfaction with the programs (question 4). Analysis also showed satisfaction and positive experience were more probable with teachers who had participated in a continuing series of experiences with a single topic.

Commenting that the questions on format and organization of in-service programs did not in fact give definitive answers as to how in-service experience should be arranged, the authors suggested that a continuing thematic program of several in-service experiences should probably consist of short-and-to-the-point segments.

It is worth noting that summer time in-service programs would not be popular with teachers in this survey. Providing release time was considered an ought-to-be factor by 92% of the elementary teachers and 90% of the secondary teachers. The analysis indicated a weak relation to satisfaction with in-service programs. Follow-up activities were perceived as ought-to-be factors by 83% of the elementary teachers

and 79% of the secondary teachers. Correlations indicated that follow-up activities appear to build a significantly greater feeling of satisfaction with in-service education (question 4) and to provide for a positive experience (question 29).

It is important that in-service activities have a practical use for teachers. Satisfaction (question 4) and a positive experience with in-service (question 29) were significantly related to having specific useable materials as a result of in-service programs. The topics of most interest to teachers were those that related to student attitudes and basic skills.

Teachers' perception of what the purposes of in-service are and what they ought-to-be were examined in nine purpose statements. The highest ought-to-be ratings were given by 96% of the elementary teachers for purposes that related to studying new methods, providing opportunity to share ideas and describing new materials and information of direct use in their classroom.

The size of the discrepancies between what-is and what-ought-to-be certainly reflected a view that although there is general agreement with the purpose, there is much to be done if these purposes are to be more fully achieved.

Statistical analysis determined a relationship of purposes with in-service satisfaction and positive experience in all but one question. The exception was the statement of purpose to analyze problems such as discipline.

A third section of the survey questionnaire for teachers

provided for open ended responses to three questions about the problems, the future, and a description of in-service programs. There is no discussion in the handbook specific to the results of these questions.

In summarizing the results and interpretations of the teachers' survey, Osborne and Bowling (1977) commented that the results contained few surprises (p. 58). Apparently teachers do want in-service programs. Their satisfaction with in-service depends on a variety of factors that are subject to the control of program designers and implementers.

Points suggested as important for purposes of planning an in-service program included: planning the program's content to fit classroom needs; participation of teachers in the selection of in-service topics and content; provision of follow-up opportunities; providing encouragement such as release time (Osborne & Bowling, 1977, p. 58).

At least two observations in a study of factors affecting the adoption of the 1971 Alberta Social Studies curriculum, conducted by Crowther (1972), concurred with the results of the NCTM surveys.

The teachers of the NCTM survey indicated a preference for a person within one's own school to conduct in-service programs. Alberta teachers indicated a preference for "workshops operated by local personnel" rather than "workshops operated by visiting personnel" (Crowther, 1972, p. 148).

Continuity of experience and topic were found to contribute to teacher satisfaction in the NCTM survey. Crowther (1972) inferred

that in-service activities should be on-going, and "not merely means of introducing new ideas to teachers" (p. 145). He found that the importance of in-service education varied between the "persuasion" and "decision" stages in the process of adoption of the new curriculum. An interpretation of these observations implies that in-service education may contribute in different ways to the rate of adoption when attention is given to the different stages in the innovation-decision continuum outlined by Rogers and Shoemaker (1971).

In considering the relationship between teachers' perceptions of in-service procedures and teachers' satisfaction with in-service education, the question arises as to what is cause and what is effect. However, the important consideration is that a positive relationship has been established, as evidenced by the NCTM study. Considering this relationship, it would then seem that efforts to provide for teachers' satisfaction would contribute to a positive disposition for viewing the attributes of the innovation being presented for adoption through in-service programs. Rogers and Shoemaker established in their research that perceived characteristics of an innovation influenced the rate of adoption. Crowthers (1972) further observed that perceived characteristics of the innovation, in this case, the 1971 Alberta Social Studies curriculum, were not equal in their importance as an influence through the different stages of the adoption process (pp. 98-99).

Although the in-service program is not the innovation to be adopted by teachers, the manner in which in-service programs are

conducted may be important in promoting a positive attitude in which the innovation itself may be perceived. A once popular phrase "the medium is the message", sums up in essence the implications of presenting in-service programs that meet with teachers' satisfaction. A recognized function of in-service education is to provide a means of communicating an innovation. Considering in-service education in terms of communication "channels", the means by which the message gets from the source to the receiver (Rogers & Shoemaker, 1971, p. 24), it becomes a "crucial" element affecting the diffusion process. As the phrase implies, the medium and the message are not mutually exclusive. The adage "do as I say" versus "do as I do" has relevance here as well. In-service training needs to be considered not only as a means but also as an agent of change (Taba, 1965, p. 473). The possibility of teachers' satisfaction with in-service efforts may only begin with the selection of appropriate methods for conducting in-service events.

A Model for Participation

Of in-service programs in general, Jarolimek stated:

> They all suffer from the limitations of lack of involvement on the part of teachers and the failure to translate into actual classroom practice much of what was presented in the in-service sessions. (Jarolimek, 1970, p. 329)

That the receiver of in-service education must be involved is a recurring recommendation in the in-service literature. Furthermore, involving the members of the target group in the diffusion-adoption process is one of the most effective diffusion techniques (Jwaideh &

Marker, 1973, p. 102).

Involving is listed by Jwaideh and Marker (1973, p. 76) as one of six basic kinds of diffusion activities devised by Guba (1968). These six kinds of activities included: telling, showing, helping, involving, training, and intervening. Involving includes or enlists the help of the adopter in the development, testing or packaging of an innovation, or in helping to persuade others to adopt.

Much of the discussion and review of the literature that follows in this section relates to the extent to which an individual may be involved in decision-making activity within the context of a group situation. Variations on basically three decision making styles as presented in five different works will be reviewed for comparative purposes. The mutualistic style of decision-making, with a central focus on co-operative involvement of group members, would seem to offer the greatest potential for adaptation as a participation model.

The terms style and model are used in a general sense to refer to the composite of characteristics typified in each approach. Ledgerwood (1975) preferred to use the term style for referring to particular orientation to curriculum decision-making (p. 6). He explained that it was appropriate to borrow analysis from the arts and humanities for humanistic enterprises such as education; rather than from physical sciences (p. 7). Westbury (1974) posed that the value of a model is measured by its usefulness rather than its sophistication (p. 56). He preferred to use the term model to provide a simplified frame of reference for considering the complexities of a particular approach to

curriculum development. Ledgerwood (1975) indicated that the three styles implicated in his study can be regarded as models of curriculum decision-making (p. 6). In this present in-service study, then, a model exemplifies a particular approach and method of operation within a system. The system in this case is the group. The emphasis is on representation of interaction characteristics, rather than on exactness or rigor.

Leadership Styles

The form of leadership employed is a major determinant of the extent to which participants are encouraged to be involved in the group activity. In the previous sections there was recurring reference in the literature to the lack of and the need for teacher involvement in in-service education. Leadership styles set the "climate" or "atmosphere" that determines the extent of individual involvement. Ledgerwood (1975, pp. 79-82) recounted the findings of Hopkins (1964) who relied on the early efforts (1939-40) of Lewin, Lippitt, and White. Three types of leadership were characterized as authoritarian, democratic, and laissez-faire.

In authoritarian groups the leader determines all policies and directs communication with the group. The group lacks unity as a group. The assumption is that group members have an inadequate fund of knowledge, and thereby have to rely on the leader. The leader represents authority and is responsible for the success of the group.

In democratic groups all policies are arrived at through group

discussion and group decisions. Decisions are made by concensus, not majority rule. Responsibility for the success of the group enterprise is assumed by everyone.

In laissez-faire groups there is a minimum of participation by the leader and complete freedom for group or individual decisions.

The conclusions of White and Lippitt (1960) on their experiments to test the three types of leadership are summarized by Jwaideh and Marker (1973):

> . . . while some situations may require authoritarian or laissez-faire leadership, in normal situations groups function most effectively when leadership functions are democratically shared among group members. Although somewhat slower in getting their work started, democratically led groups are more strongly motivated, become increasingly productive with time, are characterized by more friendliness and teamwork, praise one another more frequently, and express greater satisfaction. (p. 101)

Since participation is especially significant in bringing about change, the democratic leadership style is of the utmost importance for school-change situations. It is significant to in-service education in that recent research (Jwaideh & Marker, 1973; Osborne, 1977) indicated a direct relationship between teacher satisfaction and degree of participation in decision-making.

Ideal Styles of Decision-Making in Small Groups

Curriculum committee characteristics were studied by Ledgerwood (1975) and grouped into three categories on the basis of decision-making. The ideal styles conceptualized are: hierarchical, mutualistic,

and autonomous (Table 3). Each decision-making style was described in terms of twenty-five variables relating to the decision-making processes, views of curriculum (educational platform), and views of man, society and the universe (basic paradigm).

The hierarchical style employs a comprehensive/prescriptive mode of decision-making. It is characterized by an emphasis on efficiency; competition among members; and extrinsic motivation to the task. It favors a discipline-centered, prescriptive curriculum with the teacher as control-agent in the classroom. Classification, order and control are important to the basic paradigm.

The mutualistic style of curriculum decision-making emphasizes consensus. Participation is regarded as more important than efficiency. Education is conceived as an experience in living, intended to serve both individual and societal needs. Knowledge is integrated. Interdependence in man, society, and the universe is recognized.

The autonomous style is characterized by laissez-faire leadership and independent decision making. The role of the teacher is as a resource for students that are self directed. Individualism is maximized. The world is viewed as being in a state of disorder, man as egocentric, and society as unstructured.

These ideal types were presented by the author as logical constructs and are not meant to be representations of reality or valued as ideals. Ledgerwood suggests their usefulness is for comparative purposes. It would be an interesting exercise to compare characteristics of Rogers and Shoemaker's adopter categories with Ledgerwood's

Table 3

Selected Characteristics of Three Ideal Styles of Curriculum Decision-Making in Small Groups

Variables / Characteristics			
Decision Process	**Hierarchical Style of Curriculum Decision-Making**	**Humanistic Style of Curriculum Decision-Making**	**Autonomous Style of Curriculum Decision-Making**
Decision-Making Activities			
Mode of Decision-Making	Comprehensive, prescriptive	Clinical, consensual	Incremental, remedial
Priorities of Decision-Making	Efficient, productive	Participatory	Individually satisfying
Relation of Ends and Means	Hierarchical, Sequential	Interactive, reciprocal	Simultaneous, implicit
Interaction in the External System			
Locus of Authority	Centralized or deconcentrated	Shared, devolved by statute	Independent, devolved by constitution
Effects of Feedback	Deviation-counteracting	Deviation-amplifying	Minimally influential
Implementation of Decisions	Power-coercive, empirical-rational	Normative-re-educative, used by developer	Used by developer
Accountability	To external authority	To group and to clients	To self as individual
Interaction in the Internal System			
Interpersonal Relations	Competetive	Cooperative, symbiotic	Co-existential, separatist
Form of Leadership	Authoritative, positional, power-based	Democratic, situational, authority-based	Laissez faire
Nature of Sentiments			
Feelings toward the environment	Hostile, superior/subservient	Oneness	Disinterested
Feelings toward the group	Pragmatic	Supportive	Tolerant
Feelings toward the task	Extrinsicly motivated	Resonant	Intrinsicly motivated
Educational Platform			
View of Curricular Ends			
Major Ends of Education	To serve societal values	To serve individual & societal values	To serve individual values
Perceived Role of the Curriculum	Prescriptive	Interactive	Incidental, used when relevant
View of Curricular Means			
Curricular Content	Collected, discipline-centred	Integrated, thematic	Random, interest-centred
Teaching and Learning Resources	Prescribed, limited	Optional, diverse	Unspecified, Unlimited
Teaching and learning Strategies	Teacher dominated, post-figurative	Co-figurative	Self-directed
Evaluation of Teaching and Learning	Norm-referenced	Group-referenced	Individual-referenced
Basic Paradigm			
View of the Universe			
Structure of the Universe	Ordered Hierarchical	Self-organizing, symbiotic	Unstructured, disordered
Destiny of the Universe	Pre-determined	Self-directing	Intropic
View of Man			
Man's Reason for Being	To serve higher authority	To live in harmony with his world	To seek self-satisfaction
Man's Main Characteristic	Objectified, security-seeking	Self-directing, consensus-seeking	Introspective, self-reliant
View of Society			
Structure of Society	Stratified, authoritarian	Interdependent, harmonious	Unstructured
Function of Society	To massify individuals	To facilitate intersubjectivity in a framework of self-understanding	To maximize independence
Change in Society	Controlled by elite	Praxiological, consensual	Capricious

Ledgerwood, 1975, p. 225

ideal types. It would be to the advantage of a change agent as effectiveness to compare ideal style characteristics with the attributes of the innovation to be adopted and the communication channels selected.

Approaches to Local Curriculum Development

A study to determine the extent and value of a program development process used by Alberta Education to produce thirteen Canadian content kits in social studies was conducted by Massey, Osoba and Werner (1977). The mutualistic approach was prescribed by Alberta Education as the conceptual guide for involving teachers, governmental consultants, parents, students and other local resource people as members of the thirteen program development teams.

To provide a framework for this study, three general approaches are differentiated on the basis of decision-making as a common variable. The approaches outlined are somewhat similar to those conceptualized by Ledgerwood. They include: hierarchical, random and mutualistic (Table 4). There have been various writings and events that have provided recent support to the idea of local involvement and a mutualistic approach to program development in Alberta. The discussion in this study for Alberta Education provides for a useful understanding of the three types of approaches. Further, the account and review of the intricacies and perceptions involved in implementation of a mutualistic approach provides an empirical base for interpreting guidelines that could contribute to a greater degree of success in a future application than was achieved in this case.

Table 4

Approaches To Local Curriculum Development

	Hierarchical	Random	Mutualistic
Locus of power in decision making	Centralized: Focused in curriculum experts. Unidirectional and hierarchical control over all decisions.	Individualized.	Decentralized. Shared among participants. Mutual control of decisions.
Role of teachers, students, community personnel in decision making	Consumers or advisors.	Not specified.	Co-producers. Broad base of participation in decisions. Grass roots movement.
Major concern in decision making	Efficiency; maintenance of central power and control.	Individualized.	Programs which have meaning and acceptance in local situations.
Legitimization of decision making	The developer's expertise and institutional affiliation.	Personal or local interests.	Open and public nature of curricula.
Expected outcomes of decision making	Certainty of predefined outcomes. Ends control means.	Uncertainty and divergent outcomes.	Emergent and defined by consensus. Ends and means change en-route.

Massey, Osoba and Werner, 1977, p. 2-3

The results of the study indicated only one of the thirteen development teams utilized the mutualistic approach as prescribed by Alberta Education. Apparently the concept was not communicated successfully. The problem may have been at the source, the government consultants, or with participants' expectations, or a combination of both. The hierarchical approach is recognized as the most commonly used method for developing school programs. The expressions of many team participants provided evidence that though they were acquainted with the proper jargon of the approach, their expectations were more consistent with the hierarchical model of program development. The resultant approach in this confusion of role (or role readiness) was that a random rather than a mutualistic approach to curriculum development was mainly utilized for the project.

Less than one-third of the participants surveyed would be willing to be involved again under the same conditions, yet all but a few felt their expectations had been fulfilled in the project. Participant satisfaction is deemed to be one of the "pay-offs" to this mutualistic approach. It is encouraging to note that a large majority of the participants indicated that the method, with revisions, should be used again. There were some who felt it should not be repeated. No one wanted the method to be used again as is.

The significant explanation offered for the discrepancies between mutualism as defined, perceived, and implemented is that the approach was not well understood by those involved in the curriculum developing approach. More specifically it appears there was

insufficient conceptual understanding, development guidelines, and on-going monitoring provided for during the process.

An interjection regarding past experience of teachers may be worth considering at this point. Research indicated that persons who have been exposed to innovations that have failed or produced very little success may develop a general resistance to acceptance of all innovations (Jwaideh & Marker, 1963; Fullan, 1977). Successful experience tends to facilitate adoption of innovations that are similar to those already adopted. The success or failure of an innovative project such as the mutualistic approach to curriculum development in Alberta has wider ramifications than the project itself. The group interaction process of the mutualistic mode is by its very nature a very complex approach and is obviously very demanding of time, resources and understanding, perhaps more so than either the hierarchical or autonomous and random styles.

Blaney's Modes of Curriculum Formation

As with the foregoing models, Blaney's (1974) three modes of curriculum formation are based on where the decision-making authority lies. The institutional, shared-membership, and individual modes (Table 5) are categorized in relation to eight variables that included the characteristics of both decision-making process and the teaching/learning situation.

In the institutional mode the curriculum is prescribed and usually predetermined by someone other than the learner. It is the

Table 5

Typical Form of Selected Educational Program Variables by Mode of Curriculum Formulation

Program Variables	Institutional Mode	Shared-Membership Mode	Individual Mode
Authority	Largely external to learners; assumed and exercised by institutions.	Granted to and exercised cooperatively by learners and teacher(s).	Granted to and exercised by the individual
Objectives	Explicated prior to the instructional situation; provide the basis for planning and evaluation. May be revised by teacher. Consonant with controlling agency aims.	May never be explicit; often evolved during learning situation and have to be inferred from group activities. When explicit, more often refer to desired process than outcomes.	May never be explicit but usually can be inferred from individual activity. May take the form of a problem or project.
Methods and Techniques	Science-based and variable; chosen in terms of assumed or demonstrated effectiveness in achieving objectives.	Group-centered and process-oriented. Variable and not overly systematic.	Individual centered. Variable, and not overly systematic.
Role of Professional Teacher	Instructional planner and/or manager; diagnostician, motivator, and evaluator. Specialists may assume some instructional tasks.	As jointly determined by group members; generally as a resource person/facilitator-member.	Learner assumes most teacher tasks, though may consult specialists as required. Professional useful as model, supporter, and consultant.
Role of Learner	Dependent role regarding objectives and evaluation. To achieve prescribed objectives.	Interdependent. As a member who helps select ends, means and evaluation procedures. To maintain integrity of group.	Independent. Assumes all ends and means decisions. Responsible for own learning.
Evaluation	Generally criterion-referenced. To asses effectiveness of instruction and importance of goals. To improve program. To diagnose learning difficulties.	To determine progress toward group goals and how well group functions. Generally semi-formal, though often wholly subjective.	Self-referenced. To assess results of persistence. Generally informal; often wholly subjective. May be synonomous with solution of a personal problem or task.
Technology	Use of "hard" and "soft" instructional technology in planning and actual instruction.	Mainly application of group process theory; as determined by group.	May be selected or constructed by individual for own needs.
Emphasized Conditions for Learning	Clear objectives and student knowledge of these; relevant practice; feed-back; motivation; effective organization of learning opportunities.	Positive and accepting group "climate". Full membership of learners. Access to resources.	Freedom to explore & take risks. Access to resources, consultants, and human models.

Blaney, 1974, p. 20-21

mode most commonly used in the public schools. Efficiency of instruction is a major criterion.

In the shared-membership mode the curriculum is developed cooperatively by learners and teacher(s). Adult education often relies on this mode. It is process-oriented and group centered.

In the third, or individual mode, the individual learners formulate their own curriculum and assume whole responsibility for ends, means and effectiveness of learning. Advocates of this mode stress that learning is "not something designated by a teacher but is something done by and for onself" (Blaney, 1974, p. 17).

Blaney emphasized that no one mode is inherently superior to the others and that there is "no single approach to instruction which satisfies everyone's point of view" (p. 17). A combination or adaptation may be to provide students with objectives and allow them to choose their own means to obtain them. Educators need to clarify appropriateness and curriculum context of the mode rather than debate about their preference and its assumed benefits. The possibility of co-existence of modes is posed. Different approaches to curricular authority have their distinct advantages that in turn affect the components of an educational program.

Types of Innovation-Decisions

There is yet another triad of decision-making modes; Rogers and Shoemaker's (1971) types of innovation decisions. These three types of decision-making were reviewed earlier in this chapter. They are: optional, collective, and authority decisions. They refer to

the effect of decision-making at the system level; the social system is the decision-making unit. The locus of power in the innovation-decision types are consistent with the styles already reviewed. The collective-innovation decision process is similar to the shared membership mode in that the decisions are made by the individuals in a social system by consensus.

Rogers and Shoemaker (1971) list subprocesses of stimulation, initiation, legitimation, decision, and action (Figure 3) that related to the different roles assumed by various members of a social system involved in a collective decision process. Insight into the group decision-making process is provided by an examination of the different individual behaviors within the collectivity.

Stimulators of collective innovation-decisions are message-oriented and provide entry of a new idea into a system.

Initiators are receiver-oriented and incorporate the innovation into a plan of action appropriate to conditions of the social system. Change agents act as either stimulators or initiators.

Legitimizers represent status and power in the system. Their sanction of the idea increases the chances of securing adoption of the innovation.

In the decision stage of collective decisions, it is advantageous to have widespread participation by the members of the system. The degree to which members are involved in making the collective decisions to act determines their satisfaction with and acceptance of the decision.

As one piece of evidence that acceptance is positively related to the degree of participation, Rogers and Shoemaker cited the results of an investigation that compared the lecture method to the group discussion method. In the lecture method, there was a 3% adoption. In the group discussion method there was a 32% adoption (p. 288).

Member acceptance of a collective innovation-decision influences member cohesion with the social system. Group pressures to change beliefs or behavior are influenced by the degree of cohesion to the system (Rogers & Shoemaker, 1971, pp. 269-297).

Three of the approaches to modes of decision making are based on how decisions are made about what is to be taught and how it is to be taught. These decisions relate mainly to program development and not program implementation. If so, then how does this relate to diffusion research? In the context of the process of social change, program development can be considered as invention, the process by which new ideas are created or developed (Rogers & Shoemaker, 1971). Diffusion follows invention; and consequences constitute the last of three sequential steps in the process of social change (Rogers & Shoemaker, 1971, p. 7). Although "diffusion" was not included in the scope of these approaches, they need not be limited to the "invention" phase. The rate of adoption is very much influenced by decision-making processes (Rogers & Shoemaker, 1971).

The successes, failures and perceptions contained in the report by Massey, Osoba, and Werner (1977) have been perused with a great deal of interest and much implication for planning in-service

activities, the insights gained about leadership roles, member expectations and group interaction should provide some guidance to using the mutualistic mode in program implementation that is client-oriented. Rogers and Shoemaker (1971) stressed the importance of the change agent being client-oriented.

The intent of employing a mutualistic approach to program development was to ensure that the program would be relevant; that those who are affected by decisions should be involved in making those decisions. Chances of survival (adoption) are greater for a program that has relevance to the adopter group (Rogers & Shoemaker, 1971). The same may be said for program implementation.

Blaney's modes of curriculum formulation have a particular appeal for in-service purposes since the characteristics of the modes appear to be oriented toward including the implications in the teaching/learning situation. They have more obvious potential for the practitioner and to classroom application. Ledgerwood's modes have an appearance of being highly theoretical and philosophical, with an orientation to curriculum production, or at least to an effect on curriculum production. The approaches elaborated by Massey, Osoba and Werner are also oriented to program development but have potential for adoption or adapting to the teaching/learning situation. The leadership styles first mentioned in this section of the literature review are general in orientation to decision making and therefore have potential for adapting to specific group situations.

The selection of an ideal type mode does not hinge on the

descriptors used, but the selection of Blaney's mutualistic-like model for this present in-service project was fortuitous. Of all the mode descriptors (Table 6), "shared-membership mode" is the most attractive term for reference with elementary teacher groups. More effective communication occurs when source and receiver are homophilous (Rogers & Shoemaker, 1971, p. 14). Terms such as "hierarchical", "mutualistic" and "autonomous" may have the potential of contributing to a problem of heterophily (difference in language). For purposes of this present study on in-service education, further descriptors could be created by emphasizing the role of leadership as the common reference variable. Since decision-making would still be a significant factor, characteristics themselves would generally remain unaltered.

The extent to which there is opportunity for a member to be involved in the decision-making process is the determining factor upon which the various modes are categorized. Obviously, there are basically three general categories to which a variety of labels may be applied. As noted, Blaney's shared-membership mode appears to have advantages for use in elementary teacher in-service programs. Choosing a participation model such as the shared-membership mode has the potential for remedying, to a large extent, the limitations of lack of involvement on the part of teachers in in-service programs. If teachers are involved in the decisions, it would seem likely that the second criticism quoted at the beginning of this section, the failure to translate into classroom practice, would be less likely to occur.

Choosing a mutualistic mode for involving teachers in an in-

Table 6

Mode Descriptors Used in Group Decision-Making Models

Main title and author	Mode title, group one	Mode title, group two	Mode title, group three
Leadership Styles, Hopkins (1964)	Authorization	Democratic	Laissez-faire
Ideal Styles of Curriculum Decision-Making in Small Groups, Ledgerwood (1975)	Hierarchical	Mutualistic	Autonomous
Approaches to Local Curriculum Development, Massey, Osoba, & Werner (1977)	Hierarchical	Mutualistic	Random
Modes of Curriculum Formation, Blaney (1974)	Institutional	Shared-Membership	Individual
Types of Innovation - Decisions, Rogers and Shoemaker (1971)	Authority	Collective	Optional

service program has further benefits that influence the adoption of an innovation. Rogers and Shoemaker (1971) found extensive empirical evidence to support their generalization that a direct relationship existed between a member's satisfaction and the degree of their participation in collective-decision making. A second generalization related member acceptance of collective innovation-decisions and degree of participation. They explained that through participation in the decision-making process of the group, the individual's position is strengthened by an awareness of the group commitment. Secondly, decisions made by the system's members are more likely to meet the needs of the members more accurately than decisions made by change agents or their administrators. Yet another benefit of participation in decision making is that it allows the opinion leaders in the system to assume an important role in contributing to more widespread acceptance of a collective decision (Rogers & Shoemeker, 1971, pp. 286-7).

The Context for Planning an In-Service Program

The literature related to in-service education was searched in anticipation of identifying a consistent set of findings that would serve to establish guidelines for planning the in-service project and to provide a basis for selecting techniques and strategies appropriate to the different phases of the in-service process. An obvious benefit in combining what is known and what is effectively put to use is to lessen the gap between the theoretical and the practical aspects of professional development. The writings on in-service education

appeared sporadically, with various approaches not yet generalized as basic principles for application. In addition, the very local nature of the project in this study required some specific considerations for planning. As a result an attempt was made to incorporate the valuable pieces of knowledge gleaned from the literature into ready-reference form. This included identifying categories to which information could be related.

In-Service Education as a Process

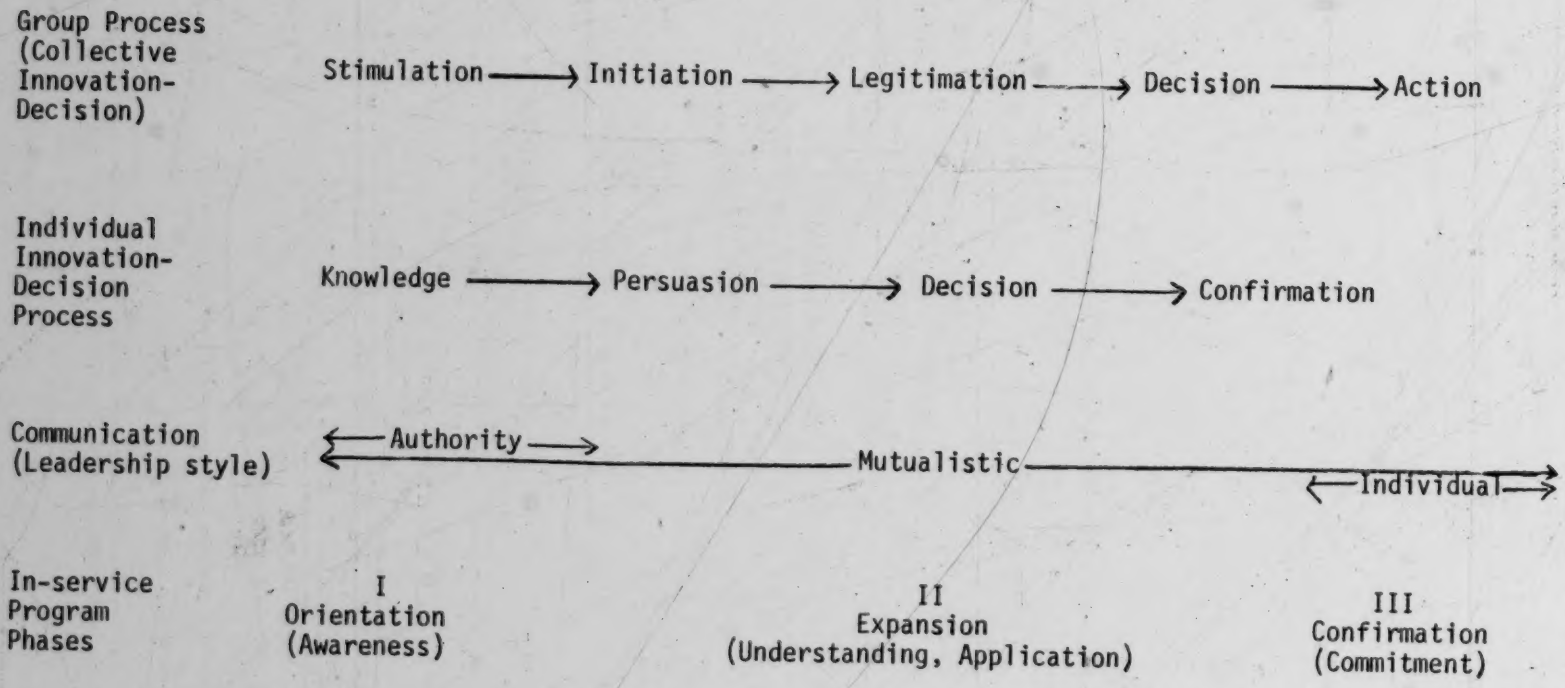
In order to establish a plan for in-service programming, it became necessary to consider an entire matrix of factors that influence the success of the program and the adoption of the innovation presented. Rogers and Shoemaker's (1971) paradigm of the innovation-decision process (Figure 1), reviewed earlier in this chapter, provides a useful model for viewing the process of individual decision-making in context of the many influencing variables. The possibility of approaching in-service education and its influencing variables in a similar model occurred. Eyler (1972) concluded that, because of our product orientation, the focus has been on the events of change; not on the process of change. The challenge put forth was to re-orient our focus and direct diffusion efforts toward improving the process. In-service education is a process for change (Harris & Bessent, 1969, p. 16). Recognizing in-service education as a process for change led to an attempt to adapt Rogers and Shoemaker's paradigm to include in-service education along with the decision-making processes and the communication

styles (Table 7). The intent was to provide a working reference for planning and sequencing in-service sessions. The type of innovation-decision (authority, collective, or independent), is one of the significant factors to be considered in planning program strategies. In view of the benefits to members involved (Rogers & Shoemaker, 1971), the obvious preference would be to use the collective innovation-decision process and the five steps of stimulation, initiation, legitimation, decision, and action, whenever appropriate. The phases of individual innovation-decision making (knowledge, persuasion, decision and confirmation) are parallel to those of the collective decision process (Rogers & Shoemaker, 1971, p. 27). It follows that in-service education when considered as a process to facilitate change, such as the adoption of a particular unit of study, needs to accommodate the decision making steps of both the group and the individual over time, and in the selection of appropriate strategies. The in-service process then may be considered to have developmental steps that parallel those of the decision making processes.

Communication channels have also been identified as influencing the rate of adoption of an innovation (Rogers & Shoemaker, 1971). Choosing the interpersonal type of communication would be consistent with choosing a strategy for the collective decision making process, for both imply interaction of members in a social system. Activities involving member participation in collective innovation-decision making and interpersonal communication would also fit the mutualistic mode of group decision-making reviewed in the fourth section of this chapter.

Table 7

In-Service Education as a Process for Change



Blaney (1974) emphasized that appropriateness was an important criteria in selecting, combining, or adapting any of the three modes of authority, mutualistic or individual leadership styles. In reality, the use of one mode exclusively may be inappropriate, especially in creating dynamic situations. Although a mutualistic approach may be used throughout the phases of the in-service program the possibility of combining modes does exist. Support for this conclusion appeared very early in the work of Rogers and Shoemaker (1971) when they established that an effective change agent is client-oriented rather than product-oriented. To be client-oriented at the beginning of an in-service program, a degree of authority-type leadership may be in order for meeting teachers where they are at. This assumption about teachers anticipating authority type leadership is inferred in several references, including Massey et al. (1977), where it is noted that the hierarchical or authority approach is the most commonly used in program development. Further support for suggesting that first steps of in-service programs may include authority-type leadership in combination with a mutualistic style is based on Rogers and Shoemaker's (1971) claim that authority decisions are efficient and effective for creating an awareness of an innovation at the knowledge stage of individual decision making. Participation in decision-making becomes more important in subsequent stages of the collective decision process, in which case the mutualistic mode would be the dominant style.

Based on the rationale presented by Rogers and Shoemaker (1971) it may be concluded that an in-service program planned with the

processes of group and individual decision-making in mind would have phases to complement the different emphasis in each of the decision-making steps. The early phase of an in-service program would then include attention to the stimulation phase of group decision making, the knowledge phase of the individual decision process, and the communication style to be used.

The pacing of the in-service program would be determined by the readiness of the participants to move along the decision-making continuum. Three phases of an in-service program seemed appropriate:

1. an orientation phase,
2. an expansion phase,
3. a confirmation phase.

The number of in-service sessions need not be limited to the number of phases. The first phase, in essence, represents the development of awareness and creating of interest. The second phase would appear to be the bulk of the program, in which understandings of the in-service topic are developed and applied. The third phase provides for closure of the particular in-service program while confirming continual adoption of the innovation. The in-service phases, as with the decision-making processes and communication styles are not mutually exclusive, nor are they all encompassing of the variables that influence the rate of adoption of an innovation. The illustration attempted here is an over simplification drawn from the literature discussed and intended to provide a conceptual reference for a sequence of interrelated processes from which to design and operate in-service programs.

Having accepted in-service education and its developmental phases as a process for change, the literature was again searched for consistent findings which would provide further guidance in designing in-service programs. An attempt was made to recognize important categories of information around which the various components of in-service could be organized. The diversity of components included in the literature reflects the complex nature of in-service education. The categories identified were readiness, participation, relevance, continuity and feedback (Table 8). A composite of variables and categories as identified in relation to in-service programs appears in Figure 4.

Readiness

Selecting strategies appropriate to phases of the in-service process appears to be one way of planning that is oriented to the readiness of the participants in the program. A number of factors influence the climate of readiness. As a result of their research Rogers and Shoemaker (1971) presented an overview of variables involved in determining the rate of adoption of an innovation (Figure 5). An elaboration of the variables was contained in the first section of this chapter. It would seem an appreciation of these elements and a working knowledge of ways they may facilitate or impede the adoption process should enhance a change agent's, or similarly a consultant's, ability to assess the readiness of the individuals and the social system to receive and adopt an innovation. Having an awareness of the readiness level should also be of great value in determining the kinds of effort required to persuade the receiver to form favorable attitudes to the

Table 8

Components for In-Service Program Design

Category of Components	Phase I Orientation (Awareness)	Phase II Expansion (Understanding, Practice)	Phase III Confirmation (Closure)
Readiness			
Participation			
Relevance			
Continuity			
Feedback			

Figure 4

Five Categories of Selected Variables for Developing In-Service Programs

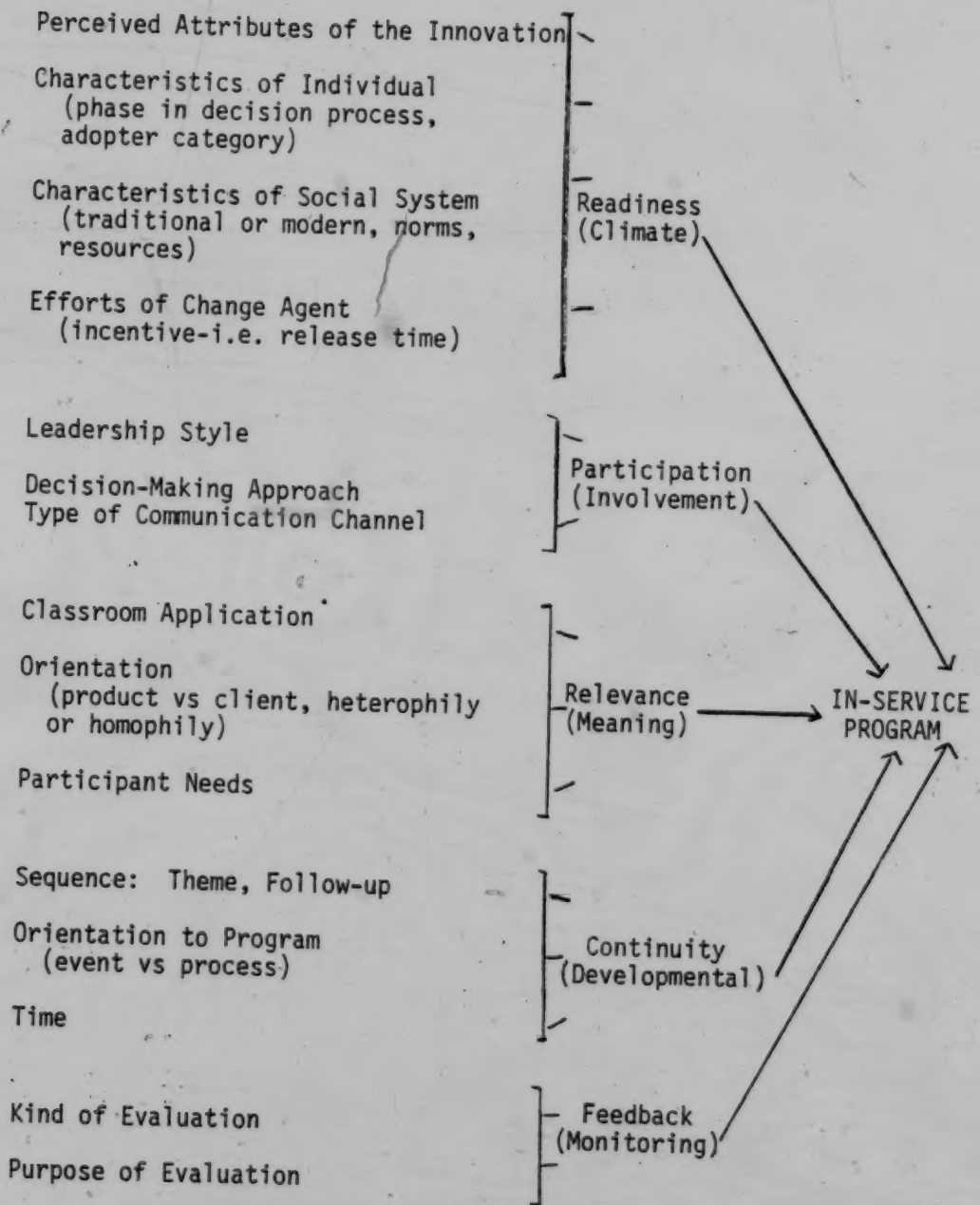
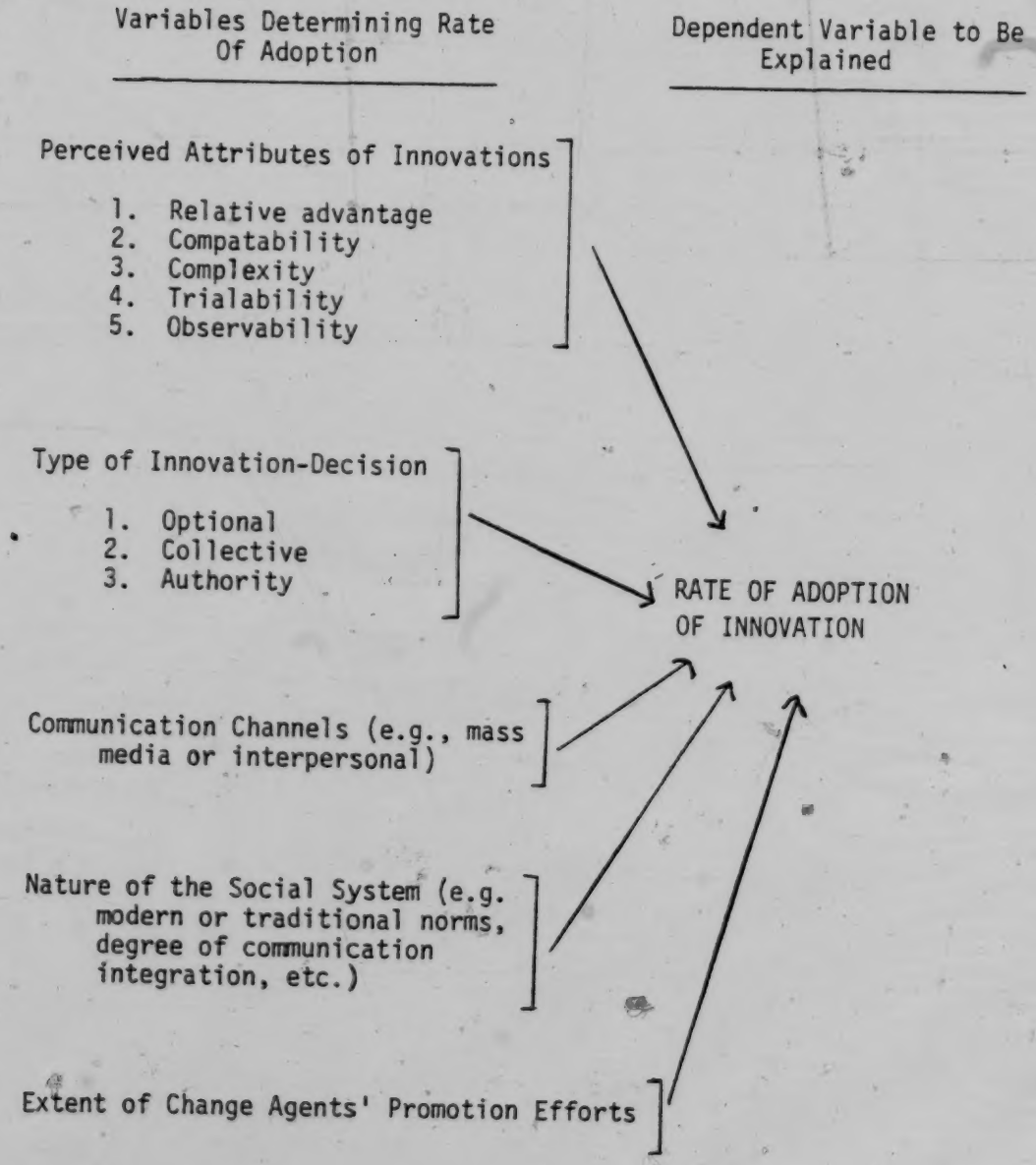


Figure 5

A Paradigm of Variables Determining the Rate of Adoption of Innovations


Variables Determining Rate Of Adoption
Dependent Variable to Be Explained
Perceived Attributes of Innovations
1. Relative advantage
2. Compatability
3. Complexity
4. Trialability
5. Observability
Type of Innovation-Decision
1. Optional
2. Collective
3. Authority
RATE OF ADOPTION OF INNOVATION
Communication Channels (e.g., mass media or interpersonal)
Nature of the Social System (e.g. modern or traditional norms, degree of communication integration, etc.)
Extent of Change Agents' Promotion Efforts

Rogers and Shoemaker, 1971, p. 158

innovation. A strategy appropriate at one level of readiness may not be effective at another level. For example, in the early stages of the collective innovation-decision process, the role of the change agent is to initiate and stimulate awareness of the innovation (Rogers & Shoemaker, 1971). Awareness of an innovation is not enough to bring about changes (Eyler, 1972, p. 98). The factors that determine the rate of adoption first affect the climate, or readiness, in which the adoption may occur. Considering the variables, Rogers and Shoemaker (1971) determined that it was the receiver's perceptions of the attributes of an innovation, not the attributes of an innovation as classified by experts which affect their rate of adoption. Educational change agents can use this aspect of readiness to plan diffusion strategies (Jwaidah & Master, 1973, p. 138).

As stated earlier, the effectiveness of mass media and interpersonal communication channels depends on the readiness of the receivers, whether at the knowledge or persuasion phase in the innovation-decision process. Another variable, the nature of a social system, determines the rate at which new ideas may be diffused (Rogers & Shoemaker, 1971); and in turn, the system's readiness probably affects the kind of resources available to the in-service planner. The desirability of providing release time was expressed in the literature as one way of providing for the convenience of teachers. There is a chance that such incentives would contribute to the readiness of the individual in the system. The category of readiness, as discussed here, relies heavily on Rogers and Shoemaker's (1971) generalizations related to

variables that influence the process of diffusion of an innovation. The level of readiness is influenced by the variables that determine the rate of adoption of an innovation. The rate of adoption reflects the state of readiness in a system. The distinction between level of readiness and rate of adoption proposed here is a matter of place in time. From this viewpoint, readiness precedes adoption, for it is the climate into which an innovation is introduced for adoption.

Participation

Among a number of recurring statements identified in the expert advice and in the evidence of research presented in the literature, the most consistent recommendation was that teachers must be involved in the planning and the events of in-service education. Research reviewed in this chapter indicated involvement as perceived by teachers was a key to their satisfaction with in-service programs (Osborne, 1977). The term involvement lends itself to various interpretations and is often used synonymously with participation. Without qualification, it appears that involvement encompasses a wide range of applications, among them hands-on activities, problem solving exercises, and decision making opportunities.

Blaney's (1974) model for participation in decision making (Table 5) would seem to offer basic guidelines for operating within a mutualistic mode, or in combination with aspects of one of the other two modes. The description of role expectations for both members and leader, brief suggestions about methods and techniques, and learning climate emphasized, put each of the three styles of operation into

convenient focus.

There was reference in the literature to the advantages of placing the focus of authority with the group. The collective type of decision making presented by Rogers and Shoemaker (1971) supports the idea that authority be "granted to an exercised cooperatively by learner and teachers" (Blaney, 1974, p. 20). Results of the research conducted by the National Council of Teachers of Mathematics showed teachers felt it was important to participate in topic selection of in-service programs. Forty-four percent of the elementary teachers indicated they had been involved in topic selection and ninety-three percent felt they ought to be involved (Osborne & Bowling, 1977, p. 38).

A number of positions that related to the importance of participation were presented in the literature. Harris and Bessent (1969) presented a problem solving approach that relies on the involvement of the group members in the exercise. Lippitt and Fox (1971) reasoned for an inquiry approach in in-service activities. The shared-membership mode is "group-centered and process oriented" (Blaney, 1974, p. 20). Perhaps it is the view of in-service education as a process that predicates participation as an important method of operation. The benefits of using a participatory approach include the motivation of the learner. Fox and Lippit (1971) indicated there was a lack of initiative among teachers attending in-service sessions. They explained this as due to extrinsic motivation. The shared-membership mode poses the role of the learner as a member who helps select purpose and procedures. Research has found that participation with others in decision-making usually leads to sharing the motivation and commitment of the

group (Jwaidah and Marker, 1973).

The suggestions for methods of operation in Blaney's shared-membership mode especially provide reference points from which to plan and implement in-service programs that attend to the need for participation. The recurring emphasis given to participation and the many connotations in which it is used provide reasons for selecting participation as an important category and component of in-service planning and process. The shared-membership mode exemplifies the idea of participation as interaction within a group.

Relevance

Another aspect of in-service education that received considerable emphasis in the related literature and research was that in-service presentations for teachers must have application in the classroom. The matter of relevance cannot be assumed by in-service presenters. An explicit reference was made by Taba (1965) in her caution that neither content background or instructional techniques can be presented in isolation of the other. Provision to facilitate the transfer of materials for instructional implementations was viewed as an important component of in-service programs in several instances cited in the literature. In ranking their gripes about in-service education, teachers gave first priority to the items concerning relevance to specific classroom needs (Osborne & Bowling, 1977). The selection of who conducts the in-service sessions may determine the extent to which in-service activities are relevant to classroom application. It has

been concluded that teachers prefer in-service sessions conducted by personnel within their own school system (Osborne, 1977; Crowther, 1972). In Rogers and Shoemaker's (1971) terms, this could be interpreted as a need to lessen the heterophily gap. They stated that one of the most distinctive problems in the communication of innovations is that the source is usually quite heterophilous, as opposed to homophilous, to the receiver (Rogers and Shoemaker, 1971, p. 15).

There is ample cause for seeking ways to improve in-service programs to provide a closer fit with teachers' needs. The discrepancy between what is and what ought-to-be is a problem described in the literature. Greater attention to the needs of teachers is perceived as a way of improving in-service activities so that they are more relevant. Whether the content of in-service is subject matter understanding, or the improvement of the practice of teaching, involving the teachers in the planning maximizes the effectiveness of the programs. Involvement has been shown to be a key to teacher's perceptions of relevance (Osborne & Bowling, 1977). In essence, the category of relevance embodies those aspects of the in-service purpose and procedure that become meaningful to the participants and their professional development.

Continuity

A recommendation to include continuity appeared in a number of the works on in-service education (Lippitt & Fox, 1971; Osborne & Bowling, 1977; Taba, 1965). The various references contribute to

the idea of continuity as a category of procedure that does and should contribute to the effectiveness of in-service education. The need to consider unifying themes, provide for follow-up, and plan in-service as an on-going process was mentioned by several writers. When considered in the context of accommodating the developmental stages of the adoption process, these procedures are at least aspects of the category, if not in fact of the concept of continuity.

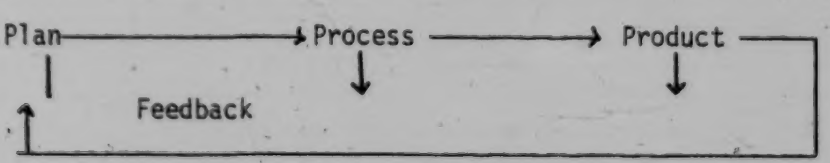
The best advice on the organizational aspects of continuity was presented by Taba (1965). Continuity involves three factors: 1) a proper sequence of learning; 2) a time-span required for orientation; and 3) a cycle of activities leading from the beginning analysis of the problems and needs to the implementation (p. 475). She criticized in-service sessions and consultant services for being "one-shot" affairs without follow-up to capitalize on what is offered. Discontinuity between a number of sessions can be avoided by organizing around unifying themes. When an in-service program is planned around implementing a unit of study, the theme might reflect a concept, topic, or skill development from out of the unit itself.

Organizational aspects of continuity may be enhanced by providing a support system which can create an active relationship among users, linkers and resources (Eyler, 1972). Rogers and Shoemaker (1971) defined the change agent as a professional who influenced innovation-decisions in a direction deemed desirable by a change agency (p. 248). The role of the consultant may be likened to that of a change agent. The success of the change agent, likewise the consultant, reflects the

extent of effort expended first to develop rapport with the clients, to motivate and stabilize acceptance of the innovation, and finally to develop self-sufficiency in the clients. The implications for the in-service planner thus extends beyond the planning and implementing of the in-service sessions themselves. The in-service educator, in this case, the consultant, needs to provide for continuity before, between, and after in-service sessions, and build towards self-sufficiency of the teachers.

Feedback

There is no simple design or standard procedure on how to evaluate in-service education. Wells and Lindquist (1977) commented that it is a complex task to evaluate anything with uncontrolled variables such as in-service education. The category on feedback would seem to include what little guidance there was in the literature to assist the in-service planner on monitoring the strengths and weaknesses of the plan, process and product. One approach that builds-in evaluation is the systems method. The systemic approach is a planning process by which all the components are identified in a model that shows their relationships and feedback lines (Wilkes, Coblentz & Strong, 1977, p. 72). A simplification of a systemic model would be:



The nature of the evaluation will depend on its purpose; that is, how it will be used. Blaney (1974) described three styles of evaluation, each consistent with one of the three modes of leadership. The purpose of evaluation in the shared-membership mode is to determine the progress toward goals shared by the group and to monitor how well the group functions (p. 21). Well and Lindquist (1977) suggested several ways of tapping professional judgements, among them: group discussions, written reactions, and observations. They commented that one of the most neglected aspects of evaluation is during the in-service process. Also, the most important evaluation of an in-service program is the one made by each participant in assessing their own professional development.

Built-in feedback techniques would serve two purposes: one for revising and future planning; the other for contributing to group cohesiveness. Harris and Bessent (1969) included feedback as a necessary step in the problem solving approach. Ongoing feedback would seem to be a necessary component in the process of in-service programing.

It is concluded that individual perceptions influence the prioritizing of so many aspects of procedures, strategies and purposes of in-service education. Since there is no "recipe" to follow, the findings in the literature have been related to five categories. These categories of readiness, participation, relevance, continuity and feedback have been created to serve as reference points from which to design and operate an in-service project. The categories are

interrelated and, diagramatically, would form a web of factors considered important in the designing of in-service programs (Figure 6). A holistic approach to considering the interrelated factors is implicit to the view of in-service education as a process for change.

Summary

The literature was selected and reviewed for the purpose of providing the theoretical framework within which the in-service project of this study was developed. The five topics addressed in each of the sections in this chapter were:

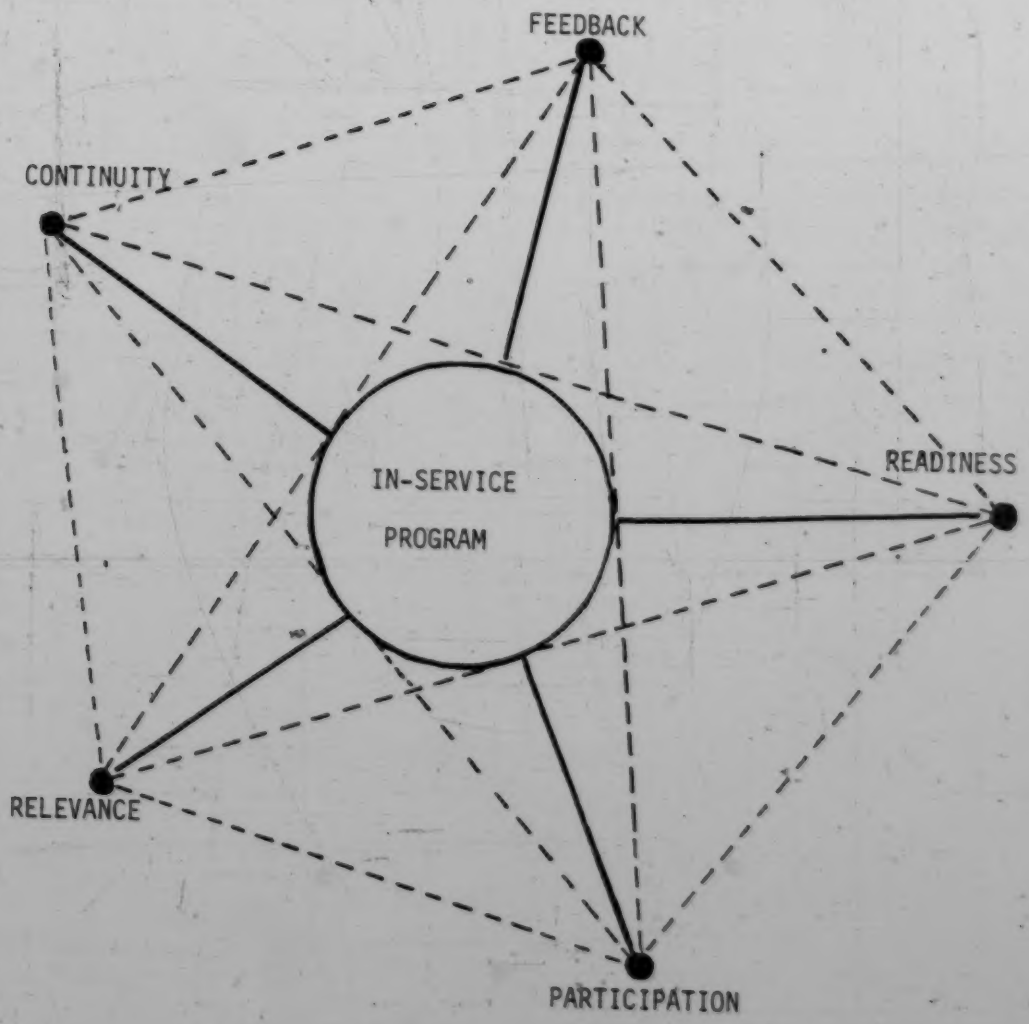
1. planning for change,
2. in-service programs,
3. research on in-service education
4. models of participation in decision making, and
5. the context for planning an in-service program.

The first section included a detailed review of Rogers and Shoemaker's (1971) research on change. The aspects of change considered were those relating to the process of diffusion and adoption of an innovation.

The literature on in-service programs contained reference to the need for better in-service education. The recommendations and guidelines suggested by several writers were outlined in the second section. The third section reviewed the findings of research on in-service education with specific reference to the National Council of Teachers of Mathematics survey of 7500 teachers in the United States.

Figure 6

A Matrix of Interrelated Factors



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DESIGNING AN IN-SERVICE PROGRAM.

In the fourth section, variations on basically three leadership styles were reviewed. The different modes were based on the locus of authority and the extent to which participants were involved in decision-making. The mutualistic mode offered the greater potential for participation of members in a group.

A synthesis of the findings was presented in the final section of the chapter. In-service education was recognized as a process for planned change. The categories of readiness, participation, relevance, continuity and feedback were presented as reference points around which the many variables of in-service programs and design could be viewed.

CHAPTER III

DESIGN AND PROCEDURES

Introduction

In the preceding chapter a review of the literature and research related to in-service education provided for the theoretical framework on which this study is based. It was concluded that in-service education is a process for change. Important categories of readiness, participation, relevance, continuity and feedback were established. The purpose of these categories was to serve as reference points around which a matrix of variables that influence the plan, process, and outcome of in-service programs may be conceptually organized. The central purpose of this in-service study is to consider the important factors for designing and implementing in-service programs.

This chapter includes an outline of the procedures employed in implementing a specific in-service program in environmental education. The methods by which the research data were accumulated and a detailed description of the case are presented. Analytical discussion of the case follows in the next chapter.

The Case Study Approach

The Case Study Method

When choosing the research framework, Olsen states that "The more unique an event the greater the demand for a case approach."

Further, "the case method is practically mandatory for the student interested in process rather than product" (Olsen, 1949, p. 329). Although it is one of the oldest methods used for interpreting social phenomena, there are so few case studies that document the dissemination of an innovation (Havelock et al., 1971, p. 17). The case study method is exploratory in nature. It requires a comprehensive description of events in order to provide an empirical base with which to compare theoretical generalizations. The case study method is therefore very demanding of the researcher in terms of time and energy. Without the additional opportunity provided to the writer to plan and conduct a curriculum implementation program for a large urban school system, a research project of this nature would not have been possible.

Selection of a Case

The case study method was selected as the vehicle for investigating the problem. Various implications related to the availability and structure of in-service programs were considered prior to making a selection. The intent of employing the case study method was to provide illustrative material for discussion purposes. A case study approach, by it's very specific nature, is not representative of all cases with a similar topic; that is, it is not comprehensive in scope.

The uniqueness with which the case study method is viewed presents an awesome challenge. An earlier reference was made to the fact that reports of practices are sketchy and "good case studies are a rarity" (Harris & Bessent, 1969, p. 1). If good case studies are a rarity, it can not be for lack of in-service activity. Within the

school system from which this case was chosen, there were numerous in-service programs being presented. They included the short after-school offerings, specific school professional development day sessions, system wide and subject specific in-service presentations, and curriculum pilot or implementation projects. After careful consideration of the opportunities available, the environmental education implementation project became an obvious choice.

There were several reasons why this environmental education in-service project was a desirable choice. First, there was provision for the program to be developmental over a series of in-service sessions. The number of teachers included would be limited to twenty, with release time provided during school hours. Secondly, the study unit to be implemented had been developed cooperatively by teachers in the local system. It was perceived that this precedent could contribute to further involvement of teachers in planning the implementation project. A third, and essential, reason was its orientation to environmental education at the instructional level. As with in-service education, there is more printed material in environmental education about what-ought-to-be than there is on how-to-do-it. Further, the integrative and interdisciplinary nature of the unit was appealing for its potential application in community and field studies.

Data Accumulation

The details of the in-service project as implemented were gathered by a variety of means. The immediate purpose for gathering the information was twofold: to maintain a sequential record of the

activities performed during the project; and to keep a record of participants' responses related to the practicality of procedures used and materials presented. The sequence of events, impressions, and observations were written in a log-book record during the project. As well as the copious notes in the log-book, the in-service sessions were recorded on tape cassettes. The reliability of the taped recordings was uncertain from the beginning due to the minimal quality of the recording equipment. The taped record was intended to serve as supplemental to the written notes. Where possible, a special attempt was made to record on tape the participants' verbal responses given during the sharing and feedback sessions of the in-service presentations. However, there was another reason for using alternative methods to the tape recorder; that is the fact that participants may be inhibited, or otherwise influenced, by an awareness that their expressions are being recorded, even with their permission.

Brief written informal responses were invited from participants as part of the on-going appraisal. In the final session of the project, teachers' appraisal provided feedback on the mode of group interaction, using Blaney's (1974) typical forms for the three ideal types. Copies of Blaney's outline were made available to each member of the group. A star was placed on the items considered most applicable to the in-service sessions. A check mark was placed on other items that participants felt were occasionally applicable. A zero was placed on those items considered not applicable.

In keeping with the shared-membership mode by which the in-service planner attempted to operate, group discussions and personal

communication provided the main on-going feedback information. The brief individual written responses provided an alternative means of on-going appraisal. A written account was maintained throughout the program and this was supplemented with taped proceedings. The case study described in this chapter and the analytical discussion of the next chapter rely heavily on the information gathered by these various means. Background on how the idea of a grade four environmental education unit began and the steps leading to the in-service project were obtained through recall of personnel involved and a search of the school system's records.

Discussion of Case Study Data

The details of the case study will be discussed in Chapter IV. Analytical discussions will include participants' responses as supportive evidence to the interpretations made. Observations and tape-recordings will also be used in context of the case study to investigate variables, components, and strategies in relation to their importance in designing and implementing an in-service program.

The Case

The Setting

Early beginnings. In the same year that the Environmental Education Act, 1970, was passed in the United States, authorizing the Office of Education to initiate and support environmental education, an Outdoor Education Committee was formed by the Edmonton Public School

System. The initial efforts and concerns of the committee were the beginnings of a long term commitment by the Edmonton Public School System to a belief

> that a school system has a primary responsibility to provide opportunities for students to develop an 'environmental conscience' which recognizes that, just as an individual is an integral part of human communities in a human environment, he is also an integral part of natural communities in a larger natural and physical environment. (Edmonton Public School Board, 1972)

A year prior to the submission of the report that included the above statement, a full time consultant in Environmental Education had been appointed. In the spring of 1973, a year following the report, Children Outdoors - the Schoolyard and Beyond became available in the elementary schools of the Edmonton Public School System. This handbook had been prepared by a committee of teachers and consultants working after school hours. The handbook and accompanying printed materials were multi-disciplinary in nature and were intended to aid teachers in planning and implementing their own programs at their grade level.

The precedent for cooperative work by committees had been set and the momentum for developing environmentally related materials for teachers' use had begun. As a result of obtaining an Edmonton Public School research grant, a 1974 summer writing team of four people began planning and selecting materials for a grade four unit of study. It is worth noting that two of the team members were grade four classroom teachers. The other two were Science and Social Studies consultants with recent classroom experience in the elementary schools. Within the two week writing period allotted, the team produced six packages of

teacher/student materials and activities, one each on Food, Air, Shelter, Energy, Water, and Land.

In the year 1974-75, ten grade four teachers were invited to field test one or more of the six packages. The two grade four teachers of the original writing team were included. The field testing program was co-ordinated by a newly appointed half-time consultant for elementary Outdoor Environmental Education. Consultant help was provided for conducting a full day field investigation with teachers and their students.

The invention of a grade four study unit. A second research grant was approved and a 1975 summer writing team selected. The team consisted of two grade four teachers, a Science teacher and the Social Studies consultant. The consultant had served on the team the previous year. The problem was very seriously stated in the research proposal:

> Man is ignorant of ecological concepts and processes. He is insensitive to the environment and lacks constructive action in relation to the environment. Present elementary school curriculums do not emphasize awareness of environmental problems or their solutions. Students should have some understanding of the environment in order to develop an appreciation of and a personal involvement in maintaining and further developing environments that are optimum for living. (Edmonton Public School Board Research Bulletin, 1974, p. 151)

With attention to developing students' awareness, appreciation, and responsibility, the writing team selected the problem of solid waste management as a topic and developed a 41 page interdisciplinary unit entitled "Something From Nothing". The writers suggested that the

study unit could be completed as a six week project or extended throughout the year. "Active student involvement" was "emphasized in order to develop positive attitudes toward the environment" (Something From Nothing, p. 1).

The learning activities were organized around four generalizations:

1. Waste products are continually being produced.
2. Waste products can be re-used.
3. Everyone in our school has a responsibility to re-use waste products.
4. Everyone in our neighborhood has a responsibility to re-use waste products.

The unit begins with an exercise involving students in classifying the useable and nonuseable items in their desk. It ends with a debate on the issue of what people should be doing with their waste products, from pop bottles to messy yards. An expanding horizons approach to the problem is implied in the sequencing of activities from near to far, from individual student to society as a whole.

The printing of the study unit was completed in late November, 1976, and the seeds of the previous years' committees (Table 9) had come to fruition; the grade four Environmental Education Unit was ready for implementation. The phase of invention being completed, the next phase of diffusion would begin. According to Rogers and Shoemaker (1971) social change occurs in sequential steps. Following invention by which new ideas are created or developed, is the process of diffusion. Diffusion is the phase during which the new ideas of the invention are communicated to the members of a social system (p. 7).

Table 9

Development of Elementary Environmental Education Programs in Edmonton Public Schools

School Year	Projects and Events
1970	Outdoor Education Committee, with community representation
1971	Consultant appointed, K-12
1972	Program report submitted to School Board
1973-4	"Children Outdoors", a handbook, prepared by a committee Research grant for summer writing, begin grade IV material
1974-5	Elementary consultant appointed, half-time Pilot grade IV Environmental Education packages Research grant for summer writing, prepare grade IV unit of study
1975-6	Pilot program for grade IV unit, "Something From Nothing" Research grant for summer writing, revise grade IV unit of study
1976-7	Implement grade IV unit, "Something From Nothing" Research grant for summer writing, prepare grade V unit
1977-8	Continue implementation of grade IV unit Pilot grade V unit, "Food For Thought" Research grant for summer writing, grade VI unit on energy

In this case, the implementation program of in-service sessions is considered to be a diffusion process.

Resources for the diffusion process. The need for an in-service program to implement the grade four unit was identified by the Elementary Environmental Education Committee, an ongoing research steering committee of subject area consultants and representative teachers. Further recommendation to include a professional development program in the implementation phase came from the teachers who had evaluated the pilot project of the previous year. Supportive funds were made available to provide substitute teachers and bus transportation. As a result, it was possible to plan for two half day and one full day in-service sessions during school hours for twenty teachers, each from a different school. Funds for transportation made it possible for teachers and their students to participate in a one-day field investigation. The implementation project was also supported by the part time efforts of the elementary Outdoor Environmental Education consultant.

Development of a plan. The purpose of the implementation program at the system level was to provide for the adoption of the unit by grade four teachers in twenty schools. It was anticipated that the adopting teachers would then provide a nucleus for a multiplier effect to help spread the use of the unit to more schools within the system. In Rogers and Shoemaker's (1971) change theory, the role assumed for these teachers would be that of opinion leaders. However, the participants were not selected by their characteristics as potential opinion

leaders. The teachers involved had all taken the initiative to offer or request to participate in the program for their own various reasons. The unit and the implementation plan had been presented at the principals' meetings, but it appeared that the teachers who volunteered had learned of the unit in very random and informal ways of interpersonal communication. At the time that the unit was printed, 25 teachers had indicated interest in becoming involved in the unit and the in-service program.

In outlining the plan for the implementation program to the Environmental Education Committee in December, 1976, the consultant emphasized that in-service sessions would be conducted to benefit the teachers, as well as their students. At the instructional level, the purpose of the in-service sessions would be to provide opportunity for teachers to develop awareness, knowledge, and skills related to teaching the environmental education unit. A cooperative mode of operation would be encouraged, since self-sufficiency was perceived as an important end to strive for. In general, the first session would include orientation to the unit and address the problem of solid waste management. A second and full day session would provide teachers with first hand experience and practice in field investigations both in the urban setting and in a natural setting. The final session would serve as a sum-up session. The in-service program would be scheduled following the Easter break and completed by the end of June. In the meantime, teachers would be contacted individually to determine their needs and expectations, and to involve them in planning the in-service sessions.

Lead-Up

By the time the printing of the grade four study unit was completed, there had been 25 names placed on the list of teachers interested in the implementation program. The names had been accumulated over the four months since school opened in the fall and were a result of teachers' personal communication of their interest to the Outdoor Environmental Education office. Information of the unit's pending availability had received only casual publicity, mainly by word-of-mouth from the consultants on the Environmental Education Committee.

A series of contacts between the in-service planner and the teachers began. First, a letter was sent to each of the 25 teachers to inform them of the printing of the unit and to ask for confirmation of their interest in obtaining a copy. Copies of the unit booklet were not enclosed with the letter. Included in the letter was a general suggested outline of the implementation program with particular emphasis on the possibility of sharing ideas about how the in-service program might be implemented. Twenty teachers responded, although they were not necessarily all from the list of 25. At least four withdrew their names from the implementation program but offered the opportunity to a colleague who then replaced them on the list of interested teachers.

In conversation, mainly by telephone, with the 20 teachers who had confirmed their interest in participating in the in-service program, it was decided the first half-day in-service session would have two parts: one part to address the problem of waste management in Alberta, the other part to explore ways and resources for teaching the unit. It was interesting to note that the usual response to queries about what would be useful to them in the first half day in-service session was an unqualified general agreement with whatever the in-service planner saw fit to include. Only three teachers qualified their support with suggestions that the session should be practical, should be very specific to the unit, and should present a plan to show how the unit fits into the curriculum.

During the weeks preceding the first in-service, the elementary consultant, who was the planner and coordinator of the in-service implementation program, searched for and obtained a number of materials related to the problem of waste and recycling. These materials were available at no cost and included a coloring book approach from Alberta Environment, "The Garbage Book" from Energy, Mines and Resources Canada, a price list from Papercycle, and a report from a local study on solid waste disposal in Edmonton. Copies of this material were sent to each of the teachers in the project, along with a second copy of the unit, "Something From Nothing", with the request that each teacher bring it to the attention of their principal and staff before placing it with their librarian.

Phase I: Orientation

The first in-service session was scheduled for a Thursday morning early in April. The classroom being used was in the elementary school in which the in-service planner was teaching. The room was equipped with large tables rather than desks. This made it possible to put the tables together in one rectangular shape around which the twenty teachers attending could sit as a group. To further create an environment conducive to working in a co-operative mode, a pot of coffee, ceramic mugs and a bowl of mixed nuts were available near the entry to the room. The use of coffee mugs rather than disposable cups was intentional. Also, since the room was well lit by natural light, the electric lights were turned off. These gestures were intended to support the idea of "practising what you preach". Since the unit of study was intended to develop awareness and responsibility in the students, consistent with a conserver ethic, it seemed incumbent upon the in-service planner to provide practical examples when convenient.

As well as providing for an environment conducive to a sharing approach and somewhat consistent with the conserver emphasis of the study unit, some attention was given to the setting that would encourage interest in the innovation itself. For that purpose, a "teaser" display included a sample of the books and films listed in the bibliography of the study unit. The materials recently sent to each teacher were also available, being placed around the meeting table in random fashion.

As the teachers arrived, they were invited to a cup of coffee

and it was suggested they make a name tag from the used computer cards provided. Just before starting time, the in-service planner also made a name tag. It was interesting to note that even though the physical environment had been planned to represent an informal approach, the group as a whole could be described as reserved and obviously looking to the in-service planner to provide direction for any interaction among those present.

To begin the in-service session on time, the consultant began writing a question on the chalk board. The question, "Where are we going?", was used as a spring board to the next question of "Where are we at?" As a preamble, reference was made to Pogo's often quoted principles: "We have met the enemy and he is us"; and, "We is surrounded by unsurmountable opportunity". With an emphasis on opportunity and resourcefulness, participants were asked to help identify some of the positive things they had already contributed to environmental education, and to indicate some of the needs that might be tended to, through an in-service opportunity such as this. In other words, participants were requested to identify something they had done successfully as well as something they wanted to find out about. They were not asked to give their names, since everyone had a name tag. The guest speaker and in-service co-ordinator responded in turn with the group. Since many of the responses referred to a need for changing attitudes, it was easy to move on to presenting a brief overview of the purpose of the unit and of the in-service program. To address the problem of waste, and specifically garbage, a specialist from Alberta Environment had been invited to make an hour long presentation. The guest was selected not

only for his expertise in his field, but also for his ability to relate to an audience in an informal way.

Following the question and coffee time, the idea of having to be resourceful in order to solve problems was re-emphasized through a group activity. The problem in the activity was insignificant in itself. Using plastic bags, the task was to raise up the heaviest person and the upside down table he was sitting on. The upside down table was placed on top of an upright table. The solution was simple once a consensus had been reached by the group. When every one placed their plastic bag between the top and bottom table tops, they could all blow air into the bags at once and raise the top table and its passenger. The activity was adapted from a lesson on air pressure. Obviously the in-service leader's participation was limited so that plans and actions of the group were not influenced by the in-service leader's knowledge of the solution.

A discussion on what could be learned from such an activity followed. It was recognized that the important feature of the activity was that the problem could only be solved by concerted effort. Participation by every member was deemed essential to solve the problem.

Members of the group were than asked to indicate their preference of leadership style, authoritarian, shared, or laissez-faire, for this implementation project. The teachers stated their preference was to work together in sharing teaching methods and resources. Their preference was to operate in a democratic, shared membership mode. They wanted to be involved in deciding what the next two in-service

sessions would entail. Their stated preference to share in the responsibilities of the in-service program was conditional, by their request, on the consultant assuming the role of co-ordinator and decision-maker when expedient.

As a start on sharing the direction taken in this in-service project with teachers, the next four activities involved the teachers, first in experiencing the activity and then in expanding on the application of the activity in relation to the core subjects and skills taught in grade four. The activities related specifically to ways of exploring each of the four generalizations in the unit. One more activity had been previously arranged for. A teacher who had been on the writing team prepared and presented a demonstration on how to make paper. Although the instructions were included in the unit booklet, the demonstration by the teacher who had tried the activity with her students added practical insight to the technique.

Near the end of the workshop, the group was led into a brief discussion of possibilities for the next session. There was no doubt about their preference for a full day experience in which to prepare for a student day beyond the school site. There seemed to be two alternative plans which the consultant was encouraged to pursue on behalf of the group. The participants were asked to note their specific preference of place, one named in the city, the other a specific site out of the city, on their name cards.

As a strategy for closure, the consultant chose to show a series of coloured slides depicting students involved in a variety of activities

related to the theme of waste management. The pictures were shown without commentary from the consultant. They were offered for the purpose of generating teaching ideas, the details of which were available by request from the consultant or teacher who initiated the activity.

Before leaving, the teachers were thanked for their participation. They were then asked to note their relief time from the classroom on their name cards so the consultant would know what times were appropriate to call them. Finally, the teachers were asked to write a comment on their card about the strengths and weaknesses of the morning session so as to provide guidance that would be shared with them for future planning.

Phase II: Expansion and Practice

This phase of the in-service program included a full day experience and planning session at one of two sites. Half of the group chose an all day session at a natural area out of the city. The other half of the group chose a full day that involved a visit to the paper recycling plant, an abandoned lot, and the Nature Centre in the river valley. In addition, the total group of 20 teachers attended a half day session with a waste management consultant at a land fill study site. The different sessions related to expanding knowledge and appreciation of the four generalizations of the unit on waste and recycling. The field sessions included guided practice in preparation for students' out-of-class investigations.

During the six weeks between the first in-service session and the full day experience, the consultant attempted to keep communication

channels open between members of the group. The consultant had contacted each teacher at least twice. Teachers in turn had contacted the consultant and each other on occasion. Some information exchanges were made about books, filmstrips and other resource material or organizations. Teachers began teaching the unit with their students. Although several creative teaching ideas were developed by a number of teachers, discretion was used in sharing these with other teachers. The consultant's intent was to support a spirit of co-operation rather than competition.

A natural area in-service day. The group of teachers who had elected to spend the day in a natural area out of the city met in a shopping mall where a car pool could be formed before driving to the site. While waiting for the various members to arrive, some discussion was prompted about incorporating the hour's drive into the plan for the day with the students. Among the ideas shared for enroute activities were the building of an alphabet from observation around a theme, such as management of waste products; or a bus bingo related to categories of conserve, re-use and re-cycle. These activities contributed to focusing on the theme of the unit, upon which the day's experiences were based.

On arrival at the site, the consultant suggested each one find their way to the top of the hill and meet in the "classroom" under the big birch tree.

When the group was assembled at the meeting site, a short

simulation of a teacher being in the same spot with a class of grade four students was enacted. A circle arrangement of the class was facilitated by gesture and example rather than directions given. The teachers in this case had a choice of spontaneously assuming the role of the students, while the consultant assumed the role of teacher. The task at hand was orientation to the site, and confirmation of purpose.

Following this brief recreational learning exercise, the consultant asked for guidance from the group in confirming the plan for the day. Activities were suggested by the consultant as the needs were identified by the teachers. The group felt the most important aspect for the day was to sample guided experiences themselves before interpreting and planning the details for the students. The pace of activities for the day was determined jointly by members of the group in response to the options which the consultant was prepared to offer and the resources recognized within the group. As an example, when a member of the group other than the consultant offered to share a teaching strategy that had proven useful, it was offered for consideration and practice as well.

The study site was a county owned natural area of knob and kettle topography. A privately owned down hill ski facility was conveniently located nearby and had been rented that spring by the school system as a study centre, from which to operate a limited number of junior and high school programs in life science and canoeing. The facility would be available to the grade four program when needed. The vegetation cover included the typical aspen mixed woods, regenerating

open disturbed areas, and several examples of the uniquely western Canadian sloughs. The diversity of habitat provided ample opportunity for investigating the natural systems of waste management. Careful consideration was given to the interpretation of the site so that concepts and terms used to interpret the natural phenomena were consistent to those similarly used in the problem of waste management in the urban setting. For example, the slough study became an investigation of a land fill site; rotting logs were viewed as recycling depots; fallen leaves were referred to as leaf litter; and a beaver lodge was an example of re-used material.

Throughout the day, an enquiring approach to learning from the immediate environment was used; a similar approach was used to explore teaching methods as well. Synthesis of learnings was facilitated by group sharing techniques. A means of on-going evaluation was provided at the same time. The resource material and equipment provided were basic and readily available or easily made. Clip boards were cardboard sheets and elastic bands with pencils attached by string. Dip nets were made from nylon panty hose and coathangers. A metre of string attached to a large nail served many purposes, one of them to delimit an area for projecting into a what-if-world in futuristic thinking.

Since each of the teachers were planning to bring their students to the same site within the three weeks following, there was an interest in developing plans that were site specific. With the site, the students, and the unit in mind, a plan for a students' day was developed jointly by the group during the last hour of the inservice

session. The students' day plan included a progression of activities that resembled the pacing and projects chosen by the teachers during their one day experience (Table 10).

The closure activity was a sharing-of-ideas exercise to bring the diversity of impressions and interactions into focus and ongoing commitment. A sharing circle was created by passing a ball of colored string around to form a ring that connected each member of the group. As each person contributed to the summing up of ideas, another connection with the string was made. The usefulness of this technique for having students recognize the significance of interactions within a group or larger system, natural or urban, was perceived immediately by teachers in the group.

Urban sites visited. The second group also arranged to meet in a parking lot of a shopping mall and form a car pool to drive to the paper recycling centre just east of the city limits. The arrangement to meet with the information officer there had been made by the in-service planner. The term in-service planner appropriately describes the role of the consultant in the group in this section of the urban in-service day. There was little opportunity for group interaction. The tour of the operation and the information presented were very interesting and provided background knowledge for the teachers, and the consultant included. In the group discussion following the tour and presentation it was concluded by the teachers that observation and recording might be appropriate learning activities for students on a similar visit. Otherwise, the value of the visit would depend on

Table 10

A Day Plan for Field Investigations

Estimated Time	Activity	Explanation
	Bus Bingo	Observation activity/enroute
	Orientation to site	Lunches stored; washrooms identified; meeting place designated; landmarks and directions established.
	Organization and purpose	Group circle organized; signals confirmed; good manners and equipment reviewed; theme and purpose of day focused.
	Sensory awareness exercise	Start up team or individual aesthetic and observation activity.
	Discovery cards	Open-ended activity, individual or team.
	Station studies	Small group in-depth projects.
	Lunch	Theme incorporated.
	Community study	Whole group discovery and investigation, differentiated responsibilities.
	Wonder wander	Whole group adventure hike.
	Tie-up	Sharing and synthesis of conclusions.
	Quiet spot	Individual quiet time, reflections recorded in log book, poem or sketching.
	Bus and homeward	Refreshments, theme songs or chants and free time.

related classroom activities before and after a visit to this plant. The suggestion of students conducting an interview was discarded because of the noise level at the plant.

The lunch hour was spent at a so-called abandoned lot. This site was the find of a teacher in the group who led the way across the railway tracks, behind an industrial site, along a dirt road and through a screen of poplar bluff to an expanse of abandoned land. Blackbirds nested in the cattails that grew around the water filled excavations. Tiny runways and grassy mounds under pieces of wrecked cars were proof that garbage for one may be riches to another. The realities of the area as an interface between the natural and social systems was a stimulating topic of conversation over lunch.

With encouragement from the group the teacher who knew the land demonstrated the methods she used to organize her class in a study of the site. Having worked with the consultant on previous occasions, she borrowed equipment and materials the consultant had on hand for the field program.

The third site this group had chosen to visit was the Nature Centre. The heavy usage and small acreage of natural area made it imperative that visitors stay on the trail system. Although there were exhibits in the building, and guided walks were offered in the outdoors to school groups, there were no printed trail guides. Members of this group elected to develop a series of activity cards and study stations on the theme of the grade four unit for use on the trails.

Land-fill study-site. This half day in-service session was

conducted by a waste management engineer of Gen Star Materials and the chief geologist of Alberta Environment. The engineer supervised the sanitary landfill studies for a very large company with holdings throughout North America. He travelled to the various landfill projects of his company and had an appreciation and knowledge of the subject that made this session most valuable for providing background knowledge and a global context to the topic of garbage. The consultant had provided the engineer with background information about the unit, the generalization themes, and the in-service project. As a result, an indoor session to provide general and specific information and an outdoor session to the landfill site nearby was planned.

The engineer was very interested in helping the teachers obtain an overview of the project. He explained data obtained from the monitoring projects in terms that related to the life style in which we live. He elaborated on experiments being conducted to use waste as a resource for fuel, land reclamation, building material, and reclaiming resources. The geologist contributed information about other study sites in Alberta and the problems of solid waste disposal. The specific problem of obtaining space for land fill was also discussed.

The landfill site visited was a clay quarry from which the cement company removed 200,000 tons a year. The hole left by the enormous excavation of clay was being filled by garbage trucks dumping their loads from the surrounding urban communities of west Edmonton, St. Albert and Spruce Grove. The significance of the problem of waste was obvious and its potential as a resource offered some hope. The interest

and encouragement of the two men representing industry and government created a feeling that teachers involving their students in the waste unit were making a significant contribution toward a solution of the waste age problem. They stated that teachers were to be highly commended for integrating real world topics in their students' learning programs.

Students' field investigations. The overview plan and activity ideas generated from the field sessions had been compiled and distributed to the teachers involved. The materials were intended to assist teachers in making their own plans of the field day. The teachers and their students made their own decisions and arrangements about where and when they would go. Costs of the field trip were subsidized as part of the implementation project. The elementary consultant was available to assist on a limited basis and in a supportive capacity, not as a leader of the outing. Attending the field investigations with the teachers and students gave the consultant an opportunity to appraise the apparent contribution of the previous in-service sessions. The field investigation day was in effect a trial of the material prepared by the group for involving students at the site.

Phase III: Summary Session

At the close of the session at the land fill study site, it had been determined that a sum-up meeting would be desirable. One of the grade four teachers offered to host the meeting at her school. Time and place were agreed upon and the arrangement would be confirmed

following the allotment of substitute teachers involved. In discussing the plan for a further in-service session, the consultant asked the group to provide a rationale in support of having another meeting. From the reasons given, the purpose for the final half day in-service program was established.

At the same time, the group was asked for their advice about sending the unit out to all elementary schools. As a result of the discussion, a memo was included along with the unit material. The memo briefly explained the implementation project and included the names of the 20 teachers involved so that they could be contacted by other interested teachers for further information.

The sum-up in-service session was to serve two purposes: evaluation of the program to date and the setting of directions for further implementation. The session began with a general review of the implementation program. The members contributed briefly, round table style, to the review. Their comments flowed from their insights and experiences gained during the implementation project. A member of the group served as a recorder and chose to organize the comments around topics of: the unit, teaching strategies, student projects, resources available, and attitudes or effect. The in-service program was not included as a topic on the chart. For more in depth review, five smaller groups were formed and each group chose one of the topics from the chart. The conclusions of each group were recorded so that the results could become guidelines for preparing a teacher resource package for the following year. The small group conclusions were also reported to the whole group

for their information and reaction.

Coffee time provided an opportunity to share anecdotes from the classroom. The coffee was served in mugs borrowed from the staff room. The significance of this gesture remained unqualified. When the group reassembled the consultant indicated an interest in receiving some review comments specific to the in-service session of the program. The number and occasion of the in-service session was recalled and participants' comments were focused on the usefulness of the session in terms of teaching the unit. Reference was made to the first in-service session and the preference indicated for using a cooperative approach to involve members in the planning and in the activities of the sessions. Assuming this had been an innovative approach, the consultant suggested it would be useful to compare members' viewpoints on the group's mode of operation. For this purpose, copies of Blaney's (1974) outline of three typical modes of curriculum formation were available for the group. Members were asked to star the most appropriate descriptions and check mark any other that had applied only occasionally. In addition, members were asked to provide their brief written comments on what they considered to be key factors in providing successful in-service programs for teachers. A superficial survey of the results provided a quick synthesis that was shared with the group. It appeared that the group had given the highest ratings to the shared membership mode.

The group had established that the unit should be adopted in all the Edmonton elementary schools. The teaching and learning

activities, the integrative nature of the theme, and the development of responsible attitudes in students were considered to be the valuable characteristics of the unit. Breaking into three small groups, the members addressed themselves to the problem of further implementation without the generous resources enjoyed by the group in this program. Both fanciful and practical ideas were generated and reported to the whole group before closing. Members considered themselves among the resources available for furthering the awareness of the unit's existence and in helping other teachers use the unit. They offered to assist with professional development sessions and inter-school visitation. A teacher captured the spirit of promise when, in closing, he said "You have helped us help ourselves, now it's our turn to help someone else."

Follow-Up

As promised, the additional selected materials prepared by teachers were reproduced and distributed to the group members. Letters of appreciation were sent to the principals as well as to each teacher involved in the implementation in-service program. The names and school addresses of the 20 teachers in the project were enclosed with the letter of appreciation.

Summary

The steps leading to the selection of the case and the methods by which the research data were accumulated have been presented. A description of the case outlined the development and implementation of an in-service program for grade four teachers adopting an environmental education unit on waste management.

CHAPTER IV

RESULTS AND DISCUSSION

Introduction

This chapter contains an analysis of the case that was described in the previous chapter. The case study provides an empirical base from which to compare and contrast with the theoretical generalizations reviewed in Chapter II. Notes from sessions, the teachers' comments, and the group discussions recorded throughout the in-service program provided support for interpreting the meaning and the practical value of the in-service plan.

Following discussion of the case study as an in-service process, the events of the program are related to readiness, participation, relevance, continuity and feedback, the five categories around which the program was designed.

In-Service Education as a Process

The progression of events in the in-service program outlined in the case provides an interesting study of a process that was planned to facilitate change at the instructional level. The design of the in-service program as a process is examined in this section.

In Chapter II, Rogers and Shoemaker's (1971) paradigm of the innovation-decision process (Figure 1) was reviewed. The possibility of approaching in-service education and its influencing variables from a similar viewpoint occurred as a result. Based on this viewpoint, the

in-service project was planned in phases that paralleled Rogers and Shoemaker's (1971) steps of the decision making processes outlined for the group and for the individual (Table 7). The communication channel and the leadership style were included and determined by their appropriateness to the phases of the in-service program. The strategies in each phase were selected using the five categories of readiness, participation, relevance, continuity and feedback as a guiding checklist. The categories are discussed in the next section of this chapter.

Preparation

The need to involve teachers in the planning of in-service education was mentioned repeatedly in the literature reviewed. The in-service planner, in this case a half-time consultant and half-time teacher, attempted to provide for teacher involvement from the pre-beginnings of the in-service program. Contact by letter and telephone were established in advance of the first in-service session. The tentative plans for a three phase in-service program were briefly discussed with each teacher. The time allotment and sequence of one half, one full, and one half day sessions was the preferred choice of the teachers, although any other proportionate arrangement of the two day allotment was possible at that point in the planning. Later in the program an adjustment was made to include one more half day in order to accomplish the plan chosen by the group.

In this early stage of planning, the consultant asked the teachers for their preference on specifics such as time allotment, and also invited general suggestions about how the teachers wished the first

session to be conducted. Their responses were invited through open ended questions; such as, would you be interested in a speaker, or a presentation on the objectives of the unit, or some activity ideas? All the teachers indicated general support:

> "Whatever you see best is fine with me";
>
> "You go ahead, you know best";
>
> "Ask me later when I know more about it";

Three teachers qualified their general support:

> "As long as it's not too general, keep it specific to the unit".
>
> "The best in-services are those that give practical ideas".
>
> "We need a plan, not just a unit. The first thing we need to know is how it fits into the grade four program".

All three of the suggestions were logical considerations to be made before making final plans for the first in-service sessions. Their incorporation in the plan of the first session can be identified:

1. To put the presentation of the Alberta Environment guest speaker into context of the unit; that is, to relate the general to the specific, reference was made to the four generalizations of the unit. He was introduced as a man who would shed some light on the problem of waste, its re-use, and the barriers and opportunities for recycling that presently exist in Alberta.
2. Practical activities included a school yard litter

classification exercise, an experience chart from an imaginary viewpoint and making a garbage dictionary. Two demonstrations were on setting up a decomposition experiment and making new paper from old newspaper. Both projects were described in the unit booklet.

3. Participants examined the activities and expanded on their application in relation to the core subjects and skills taught in the grade four program. The possibilities for integration with language arts, social studies, mathematics and science were discussed.

Although the in-service planner had the authority to make the decisions, the participants had been encouraged to take a small part in the planning of the first session and to anticipate the opportunity to assume an active role in the implementation program. As well, the interpersonal style of communication channel was introduced. In this way preparations were made to create a climate in which the in-service program as a process would begin.

The method by which participants first entered the program indicated that the individual innovation-decision process to adopt the innovation may have already been initiated. The teachers were aware of the existence of the innovation, in this case the grade four unit "Something From Nothing"; and had indicated interest in learning more about it. By requesting and obtaining copies of the unit prior to the in-service session, participants were in a position of having some awareness-knowledge of the innovation.

Rogers and Shoemaker (1971) conceived that the knowledge function of the innovation-decision process "commences when the individual is exposed to the innovation's existence and gains some understanding of how it functions" (p. 104).

Phase I: Orientation

When in-service education is viewed as a process, where does one begin the program? The grade four in-service program was planned in terms of three phases referred to as orientation, expansion and confirmation. They reflect a developmental approach to planning a sequence of events. In the first event, activities were planned for their appropriateness to the first steps in the decision making processes of the group and of the individual. The distinction between the two types of innovation-decisions, as explained in Chapter II, is determined by the decision making unit involved. In the collective decision process the social system is the decision making unit. In the case of individual innovation decisions, the individual is the unit (Rogers & Shoemaker, pp. 276-77). The group involved in the grade four in-service program was considered as equivalent to the social system in the collective decision process. Whether individual or group, the important feature is that steps in the decision making process had been identified and the in-service program began in parallel to the progression of steps in the decision processes.

Each step in the collective decision process involves different behavior that may be carried out by different individuals in the collectivity (Rogers & Shoemaker, 1971, p. 275). The outside "expert"

from Alberta Environment served in the first step as the stimulator with far-ranging perceptions of the needs and the problems related to the topic of the in-service session. Stimulation is the step in which the group becomes aware of the need for a certain innovation to be adopted within a social system (Rogers & Shoemaker, 1971, p. 277). The Alberta Environment engineer focused on the existing problems of garbage disposal in the province. He emphasized the need to decrease the amount of waste and to make items so they can be recycled. He posed some of the problems of design and marketing that need to be solved so items can be recycled. Glass, as an example cited, improves with recycling; yet cullit, the used glass, received $20.00 a ton at the Medicine Hat factory; and costs four more times than sand to ship, because it is considered manufactured goods, not primary material.

With the emphasis on recycling in the grade four unit, this presentation served to link the innovation to the greater problem outside the system. The flow of questions and discussion that followed indicated that a stimulated interest and a concern in approaching the problem had been aroused. The value of an "expert" stimulator was reflected in later comments, among them:

> "It was good to have a speaker who was so knowledgeable. It made me so much more aware of what is going on in the province and how we need to be doing something right in the schools."
>
> "We don't usually think about why we should teach something new. It's a good idea to have resource people come in and tell how they see it. It gets us thinking about what we can do.
>
> "Good idea to get it straight from the horse's mouth. It was just right, not too long."

The consultant assumed the role of initiator in the second step, by incorporating the innovation into an implementation plan for the school system and adapting it to suit the conditions of the group. The provision of resource materials prior to the first session and the sample display of books and films were evidence of an initiator at work. An initiator is an insider, a member of the system, who is client-oriented (Rogers & Shoemaker, 1971, p. 278). He works in the interests of the receiver rather than the message. The consultant operated in ways that were client or teacher oriented. The early contacts to consult with the teachers and the introductory round table sharing of participants interests were indicators that the consultant was, as one participant said, "looking after the teacher's needs." The role of initiator involves intimate knowledge of the social system (Rogers & Shoemaker, 1971, p. 278). In this case, the consultant recognized that teachers were interested in the practical application of the study unit in their classrooms. Feedback comments from the name cards in the first session were:

> "Really enjoyed the plastic bag trick. I'll use it to show my students how co-operation works."
>
> "Ideas are catchy. I know just where I can use them."

Further, the consultant was aware of the human resources in the system, and that initiation may result from the activities of more than one individual. The consultant arranged for a paper making demonstration to be conducted by one of the grade four teachers in the group. At this stage of the decision process, the grade four teacher who demonstrated the activity served in the role of initiator as well.

The knowledge function, the first step of the individual decision making process, was addressed during the presentation by the specialist from Alberta Environment, and by the activities related to the content of the unit. The engineer's presentation provided knowledge dealing with the functioning principles underlying the innovation. The activities provided "how-to" knowledge. Rogers and Shoemaker (1971) stated that most change agents concentrate their efforts on creating awareness-knowledge, which could be achieved through mass-media channels. They suggested it was more important to concentrate on the "how-to" knowledge and the principles-knowledge (p. 107). The variety of activities and the speaker contributed to the different types of knowledge gained in the first session. One teacher concluded:

> "The experiences I've had this morning have enriched my outlook and will be used to enrich my classroom."

Some encouragement was given to the persuasion function as well by involving the participants in exploring the potential integration of the unit into identifiable subject and skill areas.

The leadership style represented in this first in-service session was guided mutualistic. The involvement of members depended on the leader's directed encouragement. The consultant planned and conducted the session and provided an environment that encouraged, but did not depend on, shared membership in the group.

One of the strategies used to encourage membership in the group was in the arrangement of the physical environment. The tables had been arranged so that the participants were seated around as one group. The leader assumed group membership by occupying an equal space around

the table. Such low key leadership was intended to encourage participation and interaction in the group.

The group was credited with making one important decision: that they did wish to operate within a mutualistic mode. The judgement that it was important for members to feel they had contributed to making a decision at this time in the implementation program was based on the Alberta Education project (Massey et al., 1977). Participants in the Alberta Education project, being accustomed to an hierarchical approach to leadership, did not generally accept the role of full membership in the group even though it was outlined for them. In the grade four case, the first step of the mutualistic approach was to involve the members in experiencing the approach and then ask for their support through a decision to choose the mode of operation. It was presented as one of a choice, rather than a plan, for operation. It was assumed the group understood the different modes to choose from. The significance was on the fact that they were consulted, not that every one understood the different modes. The choice was already biased by the preceding activities.

> The individual's perceived participation is more important in explaining his satisfaction with collective decisions than is his objective participation (that is, his degree of participation as judged by others). (Rogers & Shoemaker, 1971, p. 286)

If the end result is proof of a successful introduction, then the preparation provided for making the decision was important. In the summary session, to be discussed later, there was general agreement that the shared membership mode had been successfully employed and it

was still the preferred style of operation for in-service programs at the instructional level.

Phase II: Expansion and Practice

The inadequacies of one-shot in-service programs have been proclaimed by several writers (Taba, 1965; Osborne, 1977). Such programs are considered inspirational but do not provide for in-depth study. The resources allotted to this grade four program provided the opportunity to expand beyond the inspirational awareness phase. The full day in-service session provided for developing understanding of the subject matter, simulated practice, and preparation of teaching materials.

As outlined in the case the subject of the unit was waste management. Objectives were organized around four generalizations:

1. Waste products are continually being produced.
2. Waste products are being re-used.
3. Everyone in our school has a responsibility to re-use waste products.
4. Everyone in our neighborhood has a responsibility to re-use waste products.

The theme adopted was "Conserve, Re-use, Re-cycle". The idea of re-cycle generated the most interest and was a process easily identified in both the built and the natural systems of the environment.

Natural area in-service sessions. Natural area investigations were paced so that teachers experienced a development from awareness, through understanding, to appreciation and application. Phrased in

terms of the language arts program and an inductive learning approach, experiences developed from concrete to abstract, simple to complex, and specific to general. The overriding theme of waste management provided a vehicle for unifying various activities and paralleling natural area phenomena with that of the built environment.

The study of the Woodland Waste Disposal System, one of the activities developed during the day, provided an example of the pacing of activity to correspond with development of subject matter understanding. The example is reviewed here to show the progression of activities. The teachers participated simultaneously from the viewpoints of teachers, student learners, and adult learners. The practice in teaching was, to an extent, simulated.

The study of the Woodland Waste Disposal System was initiated with a brief aesthetic experience, involving sensory awareness. Short open ended activities followed. Examples included:

Find something old. Compare with others.

Find something new. Compare again.

The discussion that arose from a specific activity prompted thinking on a complex level. The question of "when is old new and when is new old?" was appropriate to developing an understanding of the concept re-cycle.

The consultant and the teachers generated ideas for study projects such as measured plot studies, quantifying transect studies, worksheets, soil sampling, and others, all basically related to investigating the litter on the forest floor. Prompted by the quest for knowing more about the area, an interpretive tour of the woodland system

followed the investigation study. The consultant encouraged the development and sequencing of activities with open ended and hypothetical questions: What if . . .? or How about . . .? or Should we consider . . .? If . . ., then . . .? The consultant suggested a spontaneous dramatization as a way of synthesizing the learnings in the woodland system. The teachers explored the idea and "The Story of a Fallen Leaf" evolved as a creative drama portrayal of a nutrient being re-cycled.

The parallels between the natural and the built environments were inferred by the use of terms that were applicable in both environments. The fungi were referred to as re-cyclers, leafy humus was compost, the slough was a landfill site, and a rotting log was a recycling plant. Once begun, the examples of parallels compounded. Parallels were further realized by the teachers when they visited the paper recycle plant and the land fill study site.

From a review of the notes made by the consultant following the day-long in-service sessions and the comments later recorded in the summary session it was discovered that the day-long session received an abundance of supportive comments. They reflect the practicality of the events and the enthusiasm of the participants.

> "The concept of recycling is important, and it's everywhere. I can see it in seedlings, in animal droppings, in paper recycling, in soil, in the food I eat. And my students will see the whole cycle too."

> "I'm trying to think of practical ways to recycle things. The students now think everything can be recycled, even half a popsicle stick."

> "The field session was a highlight. I'm more aware of nature's recycling, it's changed my whole attitude."

"I never knew there was so much to learn and that it could be so much fun learning it."

"Why don't we learn to do things in an Ed. C.I. course? This has been the best course in teaching I've ever had."

Teaching materials. The awareness-knowledge phase is the first of four steps for the individual making a decision to adopt an innovation (Rogers & Shoemaker, 1971). This step was provided for in the first in-service session. The second and third steps of persuasion and decision were the subprocesses to which phase two of the in-service program was oriented. The main outcome of the persuasion function is an attitude toward the innovation that determines a decision for adoption or rejection. For practical purposes in this case study a distinction between the individual process and the group process is recognized without an attempt to analyze the distinction. It is conceivable that the individual function was greatly influenced by the group process. The feeling of camaraderie and well being after a full day of group work undoubtedly facilitated a positive attitude to accepting the field study component of the study unit. The preparation of student activities and a day plan (Table 10) served to confirm that the idea had been accepted for trial. Rogers and Shoemaker (1971) stated that most individuals will not adopt an innovation without trying it first on a probationary basis (p. 112).

As a result of the day-long in-service, teachers developed plans and activities for the student day. The general day plan (Table 10) was again adapted to a specific plan by each teacher and implemented during

a day out with their students. Two teachers also involved other grade four teachers and their classes in the same field investigation day. The consultant was not aware of the plan to involve other grade four classes, therefore this may be interpreted as wholly teacher initiated. It would appear that two teachers had not only formed a favourable attitude to the investigation; they had adopted it. They were already serving the roles of opinion leaders by providing opportunity for other teachers to also try the innovation.

The planning for the students' field day indicated the decision function had led to acceptance, not rejection, of the innovation, especially since the plans were implemented with the students. The individual decision to accept appeared to be coincidental and inseparable from the collective group decision to accept the innovation. The general plan for a students' day had been jointly developed by the group following the field investigations. Following the in-service session, teachers then prepared their own student material. Activity cards, worksheets, and field books in a variety of forms resulted and were used with the students. These were shared with the consultant and members of the group. Since this was a voluntary and spontaneous gesture, it was interpreted as evidence of a decision to adopt the unit, the assumption being that extra materials would not have been produced for trial only. Further evidence of the decision to adopt appeared in the summary meeting when the group confirmed their interest in continued use of the unit beyond the implementation program. They felt other teachers should adopt it too:

> "It's up to each of us to rally the interest of other teachers and offer our assistance. We're all resources now--I think we can help."

Provision for the legitimation step of the collective decision process had been accomplished in several ways. Legitimizers give "sanction, justification, the licence to act" (Rogers & Shoemaker, 1971, p. 280). The provision of release time, the principal's endorsement of the teachers' involvement, and the consultant's support probably served the function of legitimation. The land fill engineer and the provincial geologist, in their endorsement of the program, probably served as legitimizers as well.

The shared membership mode gained considerable ground during the day-long in-service session, with each member assuming more responsibility to share teaching ideas with the group:

> "I gained help from other teachers' ideas and I think I even contributed a few ideas too."

> "The interaction with other teachers has really expanded my horizons in developing a topic. The idea of being interrelated comes through everything you look at and has made me much more aware of my role. I'm excited about the field trip with my students, can hardly wait."

> "The informality and feedback was excellent except for the case of the one joker at the beginning."

> "There wasn't enough time in our day to do everything. My eyes have been opened and I can see so much I want to do. It's too bad we can't work together more often like this."

The activities in the natural areas were group-centered and enquiry-process oriented, both methods of the shared membership mode:

> "The day was practical and well sequenced. We were involved in doing things; we helped instruct; we applied ideas, practised role play. We had to think

> for ourselves and figure things out. You can get more mileage when everyone takes part. That's making use of all the resources."
>
> "Contributing is the key."
>
> "Once you get the group going, it is strictly a two way communication all the way."
>
> "Satisfaction comes from involvement."

Phase III: Summary Session

The summary meeting provided for confirmation of the group decision to adopt the innovation. The participants had developed an active and shared concern about the fate of the program. They expressed keen interest in supporting future efforts to involve new teachers in the program. The individual confirmation function was supported by the group action step of the decision process.

Once the purpose of the morning session was agreed on, the group worked within the time parameters. The idea that the consultant send a letter to the principals, in appreciation of their support to teachers involved in the implementation program, was generated from within the group. The consultant further supported the idea and promised to act on it. The small groups brain-stormed ideas for further implementation and then focused on a practical selection. In summary, the group suggested: inter-school visitation, mass publicity, system-wide professional development days, convention sessions, contests, and "more programs like this". The significance is not so much in the ideas put forth but in the fact that each person offered themselves as part of a resource bank to be called upon to provide help. Some indicated their

intention to begin with their own school staff, encouraging the use of the unit and helping where needed:

> "I'm taking this unit to the first staff meeting in the fall and I'm going to talk about how well it worked for me. If someone wants to try it, I'll sure help them, and give them some ideas to get started, like we had here. It's important to have someone tell you it's good stuff and show you how it works."

The shared membership mode was in full operation during the summary session and the decisions were made by consensus; that is, by general agreement. The points at which the group decided on actions were obscure and spontaneous. The progression of the morning evolved and turning points were part of the proceeding with, rather than changing of the direction taken. The small groups were in communication with each other and an "OK, it's time to put ideas together" came from members as easily as it came from the consultant. However, the group was not completely without a leader, and before the group acted the consultant was looked to for the expected confirmation or, if need be, rejection. The decisions the consultant was expected to confirm were mainly procedural; for example: an intent to break for coffee, reassemble, or report to the whole group. In the operation of the shared membership mode, the leader facilitated a co-operative way of decision-making. Gestures like assuming the role of recorder and passing out papers were indicators of taking group responsibility spontaneously, without waiting for a request.

This three part conception of in-service as a process provided a framework for sequencing a progression of knowledge, skill and attitude building opportunities. The view of in-service as a process for

change required an orientation to the individuals separately and collectively; that is, the orientation was primarily to the teachers and their interests, and secondarily to the product and its promotion.

An Analysis According to Five Categories of Selected Variables

The complex nature of in-service education was reflected in the diversity of factors identified in the literature. A number of variables that influence the success of an in-service program and the rate of adoption of an innovation were presented. Recognizing the contextual network in which change takes place, five organizing categories were created. The categories of readiness, participation, relevance, continuity and feedback then served as reference points around which the variables could be related (Figure 4). The five categories of variables provided a basis from which to design, operate and monitor the in-service project described in the case. In this section an attempt is made to relate the activities of the grade four in-service project to the five categories and the variables identified within the categories. The categories serve as conceptual reference points and are not mutually exclusive. There are many connections between the categories as illustrated in the diagrammatic web in Figure 6.

Readiness

Readiness may be described as the climate into which an innovation is being introduced. It is the degree to which the individual or system is receptive to the idea being presented. The rate of adoption

of an innovation is an indication of readiness in a social system. However, since adoption refers to the results of a process, the rate of adoption can be used only as an indirect measure of readiness after the fact. The characteristics of the variables that determine the rate of adoption of an idea in a social system are at the same time the determiners of readiness to adopt the innovation.

Levels of readiness reflect the nature of a dynamic process from which this category is viewed. Readiness is a perspective on the innovation diffusion process that is client oriented. This orientation to client and to process implies a sensitivity to client needs. An assessment of readiness is an assessment of receptiveness that reflects the needs of the client as perceived by the client. It is incumbent upon the in-service planner to attempt to assess the readiness climate prior to the in-service session, and to thoughtfully contribute to creating an atmosphere conducive for stimulating change.

Perceived attributes of the innovation. Rogers and Shoemaker's (1971) five attributes of relative advantage, compatibility, complexity, trialability and observability were reviewed in Chapter II. These attributes describe the perceived characteristics of an innovation and as such are important in determining whether the readiness climate is right for accepting the new idea.

In the first round table sharing of information, teachers indicated their interest in pursuing the unit because:

"I never throw out anything."

"Here's a way of involving the kids, making them

> aware they are part of the problem and part of the solution too."
>
> "How do you change attitude? I need to change my own and the children's too."
>
> "We live in a wasteful society. A good education program is also environmental education; it's part of ongoing education."
>
> "How can we change our attitudes? How can we change legislation? I think we need to look at some of the real world problems in school. It's not enough just to have a paper drive. What's it all about? What can we as teachers do? I hope this program can help."

In this case the innovation, which was the grade four study unit "Something From Nothing", had been invented through the efforts of local teachers and committee members, with the support of the system. Copies of the teachers' resource booklet had been provided by request from the 20 teachers interested in participating in the implementation program. On this basis, the innovation appeared to have a positive degree of compatibility with the system and with the 20 teachers involved in the in-service program. The provision of resource materials and financial assistance with bus transportation for a students' field study may have contributed to perceiving a relative advantage of the innovation.

Complexity is "the degree to which an innovation is perceived as difficult to understand and use" (Rogers & Shoemaker, 1971, p. 22). Many remarks, such as "even my substitute teacher could follow it with my class", indicated a favorable attitude to the innovation existed at the beginning. Provision for trialability was made by giving the teachers the option to choose all or any portions of the unit with their

students. Observability, the degree to which the results are visible, would seem to be more applicable to a physical product than an attitude change. Perhaps the use of coffee mugs instead of disposal cups was one way of providing observability.

The change agent, like the car salesman, cannot remake the product; but the environment, or the showroom, in which it is displayed, may contribute to the favorable impressions formed and reformed by the receiver about the innovation. Since it is the characteristics of the innovation as perceived by the receiver, not as claimed by someone else, that are important, the only option available to the in-service planner in an implementation program is to be conscious of putting a best foot forward; to try ways to facilitate the forming or reforming of positive impressions about the unit and teaching style involved. It is apparent from the case study that the urgency to provide for the forming of favorable impressions early in the implementation program was recognized and provided for.

The consultant attempted to introduce the unit in specific practical ways that would interest teachers, and that were within the context of the greater problem as presented by the Alberta Environment engineer. The evidence of student-made note pads from re-used paper and a simple padding press available for teachers to assemble at the first in-service session received later comments to the effect of "it looked like I could do it too". Other reflections on the first session were:

> "You didn't overwhelm us with the problem and a lot of knowledge; you made it look like teachers could try it."

"It didn't look so gloomy, it looked like a positive approach to problem solving."

"There were lots of resource materials free and library lists to order from."

An advantage antecedent to the program was that the innovation had obviously been positively perceived by the group of 20 teachers who had indicated readiness to participate in the program.

Characteristics of the individual. In the case, the individual planner attempted to select strategies appropriate to the perceived readiness of the participants. An appreciation of the individual innovation-decision process and the four subprocesses described by Rogers and Shoemaker (1971) was essential for recognizing the need for a developmental approach. Evidence of such an appreciation was discussed earlier in this chapter when considering in-service education as a process. An individual's decision about whether to adopt or reject an innovation "is not an instantaneous act. Rather, it is a process that occurs over a period of time and consists of a series of actions" (Rogers & Shoemaker, 1971, p. 100). The phases of the in-service program represent an awareness of the need to present different material and use appropriate strategies to accommodate the individual's development from knowledge through pursuasion and decision, to confirmation. The spacing of the in-service program over time, and the proportionate allotment of time to the different phases was planned to accommodate the needs of both the individual and the group decision development processes. During the summary in-service meeting, participants were asked to evaluate the time allotment over the three phases of the

implementation program. They supported the plan for a short orientation in-service session and a short sum-up session, with an in-depth session in between. Their explanations were that they didn't want to know too much at the beginning, "just give us the idea"; and at the end, "we know where we're going but we just want to be sure". There was a recommendation from one member to continue the expansion phase next year, because "we can never know enough once we've got started".

Characteristics of the social system. The school system was considered as the social system and the group as a sub-system of it. By Rogers and Shoemaker's (1971) definition, the school system was a modern, rather than a traditional system (p. 32). In this case the setting of the social system actively supported the diffusion of the innovation within the subsystem. The diffusion process was not initiated beyond the group involved in the implementation project; however, the various committees on environmental education indicated a positive attitude toward change existed in some levels of the system. The provision of consultant service, release time and transportation funds were evidence of sanction by the social system.

The norms of the system encouraged the recognition and development of opinion leaders. It was acceptable in the system to assume leadership in a multiplier effect. The teachers felt it was within their role to encourage other teachers; for example, the two who involved other grade four teachers in their school to also go on a field trip. The participants, by the final phase of the program had developed an interest in influencing further implementation of the program. Some

were willing to help with in-service sessions, others planned to encourage all the grade four teachers in their school to try the unit. Without the readiness of the school system to provide the resources and a favorable climate, this in-service program could never be.

The efforts of the change agent. Implicit in the view of in-service education as a process for planned change is the role of the consultant or in-service planner as a change agent.

> A change agent is a professional who influences innovation-decisions in a direction deemed desirable by a change agency (Rogers & Shoemaker, 1971, p. 227).

The efforts of the change agent to enhance the level of readiness were evident in the early phase of the in-service project. In review, these efforts included the interpersonal communication and involvement of group members in planning the first session; the provision of related resource material; and the thoughtful balance of practical activities within context of the greater problem. Selected resource material and practical projects were displayed. Other resource persons were involved as presenters, one being a teacher. Thought had been given to easy examples of "practice what you preach" by providing coffee mugs rather than disposal cups. These efforts were intended to provide encouragement and an image that portrayed the unit as something useful to teachers.

The consultant served as a catalyst in initiating the change process; that is, the linkage between the resource and the users, between the unit and the teacher. The level of readiness for change in the group was monitored when participants were encouraged to consider

and report, in the first round table sharing, the contribution to environmental education they had already made. As the implementation program developed, there was a shift from participants' reliance on the consultant to a reliance on themselves. Discussion flowed from member to member as easily as to the leader. Comments were offered in turn rather than, as earlier, through the leader. In the words of participants:

> "It is important that sessions have a structure that permits interaction. I felt free to ask questions and through the encouraged interaction we grew stronger as a group."
>
> "We were allowed to come up with things ourselves and this was supported. The leader has to be one of the group; not come on too strong, but be more guiding at the beginning until we get started and have some idea of the objectives for the day."

The techniques for monitoring readiness also included the participants' early statements about what they wanted to know about. From the initial round table sharing of participants, the consultant knew something of the expressed interests of the group. The participants' expressed interests included wanting to know about:

> "How can we affect the problem?"
>
> "How can we keep the kids' enthusiasm up when we study pollution?"
>
> "When we throw out so much, how can we develop a recycling mentality?"
>
> "What can we do to induce an attitude to change?"
>
> "What I want to know is how to change kids' attitudes?"
>
> "I want some new ideas for teaching kids."

In summary, several conclusions may be drawn from the discussion so far. The readiness climate is influenced by the perceived characteristics of the innovation, the stage the individual is at in the decision process, the attitude to change in the social system, and the efforts of the change agent (Figure 4). The category of readiness is an important factor influencing the effectiveness of in-service programs. Recognizing the level of readiness is an important step in the planning of in-service programs.

Participation

If the different recommendations presented in the literature were tallied, the need to involve the participants would undoubtedly receive the highest score. By the same reasoning then, a reflection on an in-service program should result in a high score for participation. When teachers have a share in selecting the problems to be solved and in planning the actual programs, they have a greater commitment to these programs (Kinnick, 1957). A summary statement made by the Advisory Committee of the NCTM survey data concluded:

> 1. Most teachers desire a voice in determining the nature of the in-service program in which they participate.
> 2. If teachers reported bad experience with prior in-service education, typically they indicated that they had not shared in making decisions about that in-service program. (Osborne, 1977, p. 216)

In essence, participation refers to the extent to which the individuals attending the in-service sessions have a share in the developments of the program. The word share is key to a definition of participation and implies a cooperative method of operation. The style

of leadership given, the method by which decisions are made in the group, and the type of communication channel chosen are among the variables to be considered in planning a participatory approach to in-service programs. Readiness was referred to as the climate; participation embodies the method.

Leadership style. A very important aspect of any in-service program is the nature of leadership given. The leader can make or break the in-service program. Leaders must be persons who, above all, relate well to the participants; and must have a mastery of the material that is the goal of the program (Dye & Tobin, 1977, p. 108).

Leadership may be characterized as authoritarian, democratic, or laissez-faire in style according to the method by which decisions are made. The democratic style was an obvious choice if participants were to share in the planning and conducting of the in-service program. The approach was further supported when it became the choice of the group during the first in-service session.

Throughout the grade four in-service program, the consultant assumed that the adults entering the in-service program were self directing and responsible professional colleagues. Providing opportunity for the participants to help plan and conduct their own learning experiences was given a high priority by the consultant in the design of the program. Interested teachers were contacted and their views invited before plans were finalized for the first in-service session.

The results of the lead up communication with the teachers

have been referred to earlier. All the teachers indicated their support for whatever the consultant decided was best. Three of the twenty teachers made qualifying requests, as reported earlier in this discussion. When alternative time sequences were offered, the teachers showed a preference for one of the choices. At this early time in the in-service program teachers were supportive generally, they were not yet prepared to be specific unless the questions posed required specific answers.

In later sessions, teachers contributed more specific ideas and were able, as a group, to give direction to the program. As an example, there were some teachers who preferred an out-of-city field site while others preferred an in-city field site. All were agreeable to attend the one site that received a majority vote. As it turned out, the split was even. As well, two sessions were preferable to one for two reasons: a smaller group was desirable for field work; and twenty substitutes are not as easily arranged for as half that number. Again, there was flexibility that made it possible for the group to pursue and decide, with the consultant's support, on the two sessions.

The leader assumed the role of a co-ordinator, adviser and facilitator, providing guidance, practical suggestions and alternatives from which members proceeded to select a plan for action. The emphasis was not on generating ideas to choose from but on the choosing from options that were open to the group. The objective was to provide opportunity for participation, to involve members in the learning situation itself and also in the planning of the program.

To illustrate, the discussion that led to the decision of a meeting place and time is reported here:

Following the visit to the land fill study site and before dispersing for the day, the group met to consider plans for a summary session. The consultant asked first if the group wished to have a summary session, as had been indicated earlier. The responses offered were:

"Yes, I think it is important to see where we're going" and

"I think we need to look at this in overview now."

No further responses seemed to be forthcoming, so a group member asked:

"OK, where shall we meet?"

A fourth member offered:

"You are welcome to come to our school. I'm sure it will be alright."

With no further offers, or objections, the consultant now said:

"Is Bonnie's school the next meeting site? (pause) What about time? Is the second week of June suitable?"

Responses were:

"Any day but Monday. That's our track and field."

"That's a busy week for me. Could it be a bit earlier?"

"I'd suggest later. We've all got so much to do in the early part."

At this point the consultant suggested:

"Who can meet on June 22. That's a Wednesday."

Responses were:

"Fine by me" and

"If it were Tuesday, it would be better."

The next question was addressed to the consultant:

"That's your teaching day, can you come?"

The consultant replied:

"I may be able to arrange an exchange for that morning."

The member who offered their school spoke again to the group:

"Then we'll count on you for Tuesday morning, June 21st. Right?"

After a pause that seemed to indicate a place and time had been decided on, the consultant asked:

"We want to look at where we've come from and where we're going. Is that right?"

A remark followed:

"Yes, we need a summing up 'cause I think we've come a long way. I'd like to hear some ideas of what others have done, too."

The consultant pursued this opening to gain further comments related to how and why the summary session would be useful to the teachers.

In this evolving manner, group decisions were made. The leadership style was purposefully chosen to be democratic in nature. There was freedom to choose within limits of an overall plan. The consultant provided leadership within a framework that allowed for flexibility. As a result, the teachers became part of the planning process and assisted in conducting their own learning experiences.

The teachers' expectations of the role of the leader were taken into account early in the project; and the participatory method was approached developmentally. Teachers were encouraged rather than expected to participate in the progression of the in-service program. All the teachers participated at some time or other. The degree to which each teacher became involved varied, as did the personalities. No one teacher was out of place, neither domineering or retiring. Perhaps this was no ordinary group, since they had come together with a common purpose: to try the grade four environmental education unit.

The round table spatial arrangement, begun in the first session was a technique used throughout the program, inside or outside, when the group met as a whole. The participants were aware that this was the consultant's favoured grouping pattern and it was accepted as more or less routine. Judging from the use of the pattern with their own students when out of the classroom it appeared the teachers themselves later adopted the circle style grouping for their own. In this arrangement, all participants and the leader were visible to each other and shared an equal status in the physical space. Even without saying a word, each person was a visible part of the group. It would seem this would encourage participation. On the other hand, they were still part of the group even if they did not take an active part. The emphasis was on the group unit to participate rather than on the individual. As long as some members were involved, the group was credited with the activity. In this way, individual successes became the group's success. An important subtlety became apparent after listening to the

taped proceedings. The leader used the word we more often than the words you, me, or I. It apparently became a habit with the group members, too, as is discernable in the discussion just reported. Planning authority was shared with the group as the opportunity arose. The final responsibility was accepted by the consultant, so that the group was not in a position that was forced. The sharing of the planning was in essence an option, nonetheless, a real option. The program had considerable flexibility so that there was a choice of alternatives within the parameters of the project. Several examples have been cited to this point.

The leader's facilitative role became less demanding in the later phase of the implementation program. This progression is consistent with the view of in-service education as a process. In the later steps of the innovation decision process, individuals and groups have made a decision to adopt or reject the innovation and proceed to the action step. A greater degree of independence is inherent in the action step, when the individuals and group proceed on their own decision.

In reviewing the in-service project, the diminishing dependence on the leaders and the increasing independence of the participants is evident in organizational aspects at least. The consultant arranged for the place and time of the first in-service session, but needed to provide only a supportive role in the arranging of the last session of the project. In the first session and in the beginning of the field investigations, the leader often guided activities. In

the later stages of the implementation program, the teachers became more active, conducting their own student field investigations and confirming a commitment to assist in further use of the unit by other teachers.

The comments from the most experienced teacher of the group reflect the value of in-service education in building competency and confidence:

> "The only way to understand what it is all about is to do it. I thought I wasn't the type for getting my students involved outside the classroom. This has been an opportunity to develop more confidence in my own ideas. And through interaction with the others, I have a renewed respect for teachers and what we're trying to do. As for my students, I got to understand them so much better on the field day. It's so important to let them see and do the real things. We forget, and keep abstracting; and they haven't the experience to relate to."

Considered as a continuum, dependence upon the leader's direction would decrease as the participants' independence increased. The optimum condition aimed for was somewhere between the two ends, as exemplified in Blaney's (1974) shared membership mode.

Blaney's (1974) outline of the three modes of curriculum formation proved to be a most useful model to follow as a leadership guide. The shared-membership mode suited the purpose of the group and its size. The items under the shared-membership mode that were most relevant to the design of the in-service program were those related to program variables of: authority, methods and techniques, roles of teacher, role of learner, evaluation, and conditions for learning. Of less value were the items related to objectives and technology.

At the end of the in-service project the participants provided an evaluation of the method of operation during the in-service program. On copies of Blaney's outline, the shared-membership mode received first place stars in most items. An occasional star was placed on an item in the individual mode. Ninety-four percent of the teachers starred five of the eight items under the shared-membership mode as being the most appropriate to describe the method of operation. The items were related to the program variables of authority, role of teacher, role of learner, and conditions for learning. In other words, out of a possible 20, these items received 19 stars. All other items under the shared-membership mode rated 18 stars in each. The results of this evaluation indicated that the attempt to operate within the shared-membership mode was an unqualified success. In addition, it was apparently the members preferred mode of operation. Comments included:

> "I feel in all of these the interrelating or shared membership mode is the best, for no man is an island."
>
> "I really liked the format, the way the in-service was set up so we could be involved."
>
> "The way we went was great. We had some say about how things went. Usually it all happens to you and then you walk away, because the resource person makes all the decisions for you."
>
> "You gave us a self help model."
>
> "I like the shared-membership mode. I think it has great potential, but the success is largely due to the role of the leader."
>
> "We all took part, even me."

Decision making approach. The foregoing discussion related to participants' involvement in the development of the in-service program. The present discussion refers to the decisions that lead to the adoption of the innovation.

The purpose of the implementation program was to facilitate the adoption of the unit "Something From Nothing" by grade four teachers. The in-service program was designed to involve participants in a collective-innovation decision process to adopt the unit. A collective decision is made by consensus of the individuals in a social system whereas authority decisions are imposed upon a system (Rogers & Shoemaker, 1971). Earlier in this chapter the collective decision was examined in relation to in-service education as a process. It is presented now as a method of ensuring participation.

Having accepted a democratic leadership style, it follows that an in-service planner would provide for collective decision-making to adopt the innovation being introduced. The in-service planner in the grade four case accounted for the steps leading to the decision to act by providing for stimulation, initiation and legitimation. The outside specialist from Alberta Environment served as the stimulator. The role of initiator was shared by the consultant and the grade four teacher who demonstrated paper making. The initiator presented the innovation in ways that were in the interests of the teachers; that is, ways in which the unit could be used in the classroom. Legitimation, the stamp of approval from the system, was inferred by the support provided for the program to be implemented. Further

legitimation was provided by the landfill management expert when he endorsed the grade four program. Stimulation, initiation and legitimation are as outlined previously, the three steps preceding the group's decision to adopt the innovation.

It is in the fourth stage, that of decision, that the focus is upon the members to decide to adopt the innovation. The group decision to plan a student's field investigation was interpreted as an indication the teachers had decided to adopt the unit. Further action on the decision included their eagerness to have an influence on the fate of the program, to become involved in promoting the program to other teachers.

Rogers and Shoemaker (1971) found a positive correlation between members' acceptance of a collective decision and member cohesion with the social system. The cohesiveness of the group appears to have contributed to the ease with which a collective decision to adopt the unit was made.

Types of communication channels. Another aspect of the participatory approach is the interpersonal type of communication. The mutualistic style of leadership and the provision for collective-type decision making ensured the involvement of the teachers in the grade four program. The interpersonal type of communication provided for one-to-one type of exchange. The consultant made various contacts with the participants by telephone and visits. Interpersonal contact was encouraged by providing members with a list of names and school phone numbers of the group.

In this in-service project a high level of participation was

encouraged and provided for. Satisfaction with the in-service session was generally expressed by the members:

> "The key? Activity oriented was the key."
>
> "All in all, it was the doing things, getting involved; it seems a good example of group ecology."
>
> "We did things together. We were involved in the sessions and it wasn't put on. It's the only way to get a commitment."
>
> "Involvement is the key."
>
> "When a teacher gives up their time to go to an in-service, they want it to be good, or they won't come back. I'll be back for this one, you can count on that, 'cause there's twenty other teachers to learn from."

The significance of participation goes beyond satisfaction itself. Rogers and Shoemaker (1971) found research supported the idea that satisfaction with a collective decision to adopt an innovation, in this case the grade four unit, was positively related to the degree of participation by the members in the social system making the decision.

Relevance

A fundamental and primary purpose of in-service education is to improve the competency of teachers and achieve better education in the schools. Yet, the literature abounds with claims of the inadequacy of in-service education to meet the needs of the classroom teacher. The NCTM survey showed that the major gripes about in-service education were those related to classroom application. One of the greatest criticisms of in-service is its lack of relevance to the practice of

teaching. The discrepancy between the purpose and the practice of in-service education is the area of concern addressed by the category of relevance. Relevance refers to the meaningfulness of the content presented. It refers to the perceived usefulness of the material for classroom application.

Classroom application. Considerable effort was directed toward an attempt to ensure that the material and activities of the grade four in-service project were relevant to the teachers involved. One approach that was used was to involve the teachers in topic selection. It is a strategy by which teachers feel the program fits their needs (Osborne & Bowling, 1977, p. 32).

Believing that a visit to a land-fill site and a presentation by the managing engineer would be of limited classroom application, the visit was offered as an option. All twenty teachers attended. When queried about how useful the session had been, teachers replied:

> "We get bogged down. We need to free ourselves to see the big picture in which we're teaching."
>
> "I understand the generalizations now. We really do have a lot about how we make less, and recycle more. If I understand, then students will understand a little too."

Another strategy was the involvement of the teachers in sharing ideas from their experience. In the first session, a teacher had been invited to demonstrate paper making. In another instance, a grade four teacher shared her so-called abandoned lot with the group. With the group's encouragement, she also shared the ways she organized her students in a study of the site. Both teachers talked about their

experiences, both relevant to grade four teachers. The value of the sharing of ideas was endorsed:

> "The sharing sessions really opened my eyes to see the ways to teach."
>
> "For every idea I gave, I got twenty more in return."
>
> "I gained help from others."
>
> "Enthusiasm is contagious."

In an endeavor to make presentations relevant to classroom application, there is a danger of presenting only gadgets and gimmicks. On the other hand, Taba (1965) cautions against presenting content background without "a simultaneous effort at instructional implications" (p. 475). An attempt was made to balance background knowledge with student activity ideas. An example was the visit to the paper recycling plant when time was taken following the tour presentation to explore preparation and follow-up student activities. An effort was made to involve the teachers in recognizing the relevance of the activities to teaching the unit. The events of the in-service sessions were examined for their fit with the concepts in the grade four unit.

Judging from the feedback from the teachers, the conscious attempt to relate the in-service activities to the classroom was successful:

> "I realize now I don't have to know all the answers before I can teach it."
>
> "Teaching by example is a method too."
>
> "My students have gained because I have a new interest and focus in teaching. I have something to teach about."

> "I came because I thought I was no good at science, I didn't think my approach was valid. It's been reinforcing to see I could use my discovery approach and it's OK."
>
> ". . . . and everything works with the kids, too."

The needs of the classroom teacher were real. Communication is more rewarding when it is between a source and receiver who are homophilous (Rogers & Shoemaker, 1971, p. 210). Certainly the similarity between teaching responsibilities of the consultant was a benefit that contributed to providing an in-service program that was relevant to the needs of the teacher participants.

Continuity

The discrepancies between purpose and effect have led to a realization that the expectations of in-service education have been greater than the opportunities provided. The need to consider in-service education as a process has been claimed (Eyler, 1972; Taba, 1965). Earlier in this chapter, ways of designing in-service education as a process were discussed. Additional thoughts on how an in-service planner may provide for continuity as an essential concept of the process become evident in a review of the case.

Continuity is that aspect of in-service design that provides for an on-going developmental sequence for acquiring knowledge, skills and attitudes. It involves the pacing of in-service material and events over time. In the grade four in-service project the resources for continuity were at hand. The funds were available for planning a sequence of in-service sessions. The consultant had established a

three phase process orientation to the project. The study unit on waste management provided ample opportunity for development of a unifying theme. Although the consultant's time was limited, it appeared to be sufficient for maintaining and reinforcing continuity through follow-up contacts between sessions.

Taba's (1965) criteria for providing continuity were listed in Chapter II as: 1. a proper sequence of learning; 2. a time-span required for orientation; 3. a cycle of activities leading from the beginning analysis of the problems and needs to the implementation (p. 475). Within the confines of the opportunity available, the grade four in-service project was designed as a sequence of learning activities. It was oriented to a developmental process over time, and led from awareness, through trial, to implementation. That change in teaching-learning style had been effected may be inferred from selected comments:

> "I've changed my whole attitude, not just to the problems of garbage but to teaching. It's more fun and we get more done when the kids get involved too."
>
> "The field day was the highlight. It gave me renewed interest in teaching."
>
> "I've never tried role playing before. It really gets you thinking."

Orientation and participant needs. Orientation to client versus product may be a key to providing in-service programs that are relevant. Much of our effort has been expended on improving the product. A change agent must be much more client-oriented (Rogers & Shoemaker, 1971, p. 6). The in-service planner in the grade four program, being a classroom

teacher and using the same unit as the participants in the group, viewed the unit from the perspective of a practising teacher as well as a consultant. The participants recognized the consultant as a teacher as well. The introductory session was held in the consultant-teacher's classroom where students' activity was evident. There was reference by the participants to the consultant as a teacher. For example, when the summary session time and place were being decided, the consultant's teaching time was considered.

In the field sessions, the remarks to the consultant included:

> "I can see you practise what you preach. You experience with the children and we know that you are doing what we are doing. You really believe we have ideas you can use too."

> "It's easy to see you are a teacher too. When you show us, I can see a direct application to my class."

Feedback

Evaluation as an assessment of achievement is a common expectation at the completion of a project. An attempt was made to include evaluation as on-going feedback during the grade four implementation project. This was accomplished in the main by informal sharing circles and round table discussions. In addition, attempts were made to secure brief written comments from participants, focusing on one or two questions presented verbally by the consultant. For example: If you had to choose only one event or idea out of this session, what would it be? Some replies were:

> "Any experience is informative for me."

"The magic of the leaf litter study."

"The questioning technique."

"The way everything is connected."

"Variety and enthusiasm. We're not sitting all the time. We talk, listen, discover, discuss and LEARN together."

The written comments provided encouraging support for the plan and the procedure of the project but were of limited value for providing quantitative feedback.

For example:

"It's the best thing that's happened to me."

"We have to start somewhere but it can't just be grade four who are doing studies. We need a plan for all the grades. We need a plan for teachers to learn too, not just present a unit, but give teachers some background."

"Interaction among the learners is important, not just being taught."

". . . how important it is to think positively with the students, even about a bad situation."

"I gained immeasurably from the continuity with a small group."

Feedback served a different purpose for the consultant than it did for the teachers. The consultant was interested in feedback as a way of monitoring the implementation project. The participants were interested in the practicalities as they related to classroom application. The items listed by the participant recorder, for example, in the summary session included the unit, teaching strategies, student projects, resources available, and attitudes of effect. The list did not include the in-service sessions. Although the teachers were very

involved in the development of the program, feedback beyond the informal discussions of the group's progress seemed to be redundant for the members. Perhaps a better interpretation would be to say that the group's interest in evaluation was subjective, rather than objective. This would be consistent with the shared-membership mode of operation.

A semi-formal appraisal was attempted when participants starred the most appropriate descriptions of the group's operation on Blaney's (1974) outline of three modes. Wells and Lindquist (1977) suggested the most important evaluation was that of the in-service process, rather than the product. The feedback discussions of the groups served in part as check points and permission points to proceed with the plans. The feedback discussions served the purposes of decision making in the in-service process as well.

Wells and Lindquist (1977) cautioned that the purpose of evaluation should be kept in mind, as well as the economy of resources available. In the grade four in-service project, evaluation was not required for justifying the program. Efforts were then placed on using the feedback information to plan further or adjust the activities so that they were relevant to the group's expectations. The judgements were made with help from the professional colleagues in the group, in keeping with the mutualistic mode of operation.

Summary

The analytical discussion of the case was dealt with in two sections of this chapter. First, the case was analyzed in terms of three phases in the development of in-service program as a process for change. The analysis continued in the second section with a discussion of the case in relation to the five categories. Events of the program and responses from the participants were discussed in terms of readiness, participation, relevance, continuity, and feedback.

CHAPTER V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

Introduction

This concluding chapter of the study contains a review of the problem, the case study, and the results of the analyses. Following the summary review, conclusions resulting from the study are presented. The implications for designing and researching in-service education are then posed.

Summary

Purpose of the Study

With an ever-increasing pace of change, education has been looked to for providing solutions to the situation at hand. A growing awareness of environmental issues has led to a concern for making educational programs relevant to the real world of the student and conducive to developing an environmental ethic. Environmental educators face a challenge of fulfilling two general needs: the need for environmental quality and the need for improving education.

In-service development is one way of improving the professional competence of educators at the instructional level. The problem of designing an in-service program to provide for subject matter understanding and alternative teaching strategies was the focus of this study. The purpose of the study was to determine the factors important

in designing an in-service program, and to devise ways of applying those factors to an in-service program for teachers.

Procedure of the Study

A framework for designing and monitoring in-service programs was developed as a synthesis of theory, method and research reviewed in the literature. Rogers and Shoemaker's (1971) research on change as related to the process of diffusion and adoption of an innovation provided a base. From the literature on in-service programs the need to view in-service education as a process for planned change was identified. A review of research related to in-service education indicated the importance of involving teachers in the planning of the in-service program and the need for materials to be applicable in the classroom. Leadership styles were considered and Blaney's (1974) shared-membership mode was chosen as a guide for leadership that provided for participation of the members.

With an orientation to in-service education as a process of sequential events, three phases for in-service programming were posed. The steps of the innovation-decision process for individuals and for groups were identified components to be accommodated in each phase. The three phases were described as orientation, expansion, and confirmation. The developmental sequence of an in-service program was viewed as beginning with awareness of the innovation. It follows through to gaining understanding of the subject matter and practicing teaching methods. It leads to a sum-up and closure phase that served to confirm the commitment of the participants to on-going practice

of the innovation. The closure phase is also a confirmation of the self-sufficiency that has been developed.

For ease in referencing the matrix of variables that influence the effectiveness of an in-service program, five categories were created. The categories of readiness, participation, relevance, continuity, and feedback provided a useful framework from which to plan and monitor an in-service project.

Readiness refers to the climate into which an innovation is being introduced. It is the degree to which an individual or system is receptive to the new idea. Variables affecting readiness are: the perceived attributes of an innovation; the stage the individual is at in the decision process; the attitude to change in the social system; and the efforts of the change agent.

Participation may be described as involvement. The style of leadership, the method by which decisions are made in the group, and the type of communication channel chosen are among the variables to be considered in this category that embodies the method.

Relevance refers to how meaningful and useful the material presented is to the teachers involved. In this category consideration is given to classroom application, orientation to the teacher client, and the needs of the participant.

Continuity includes those strategies that provide for an on-going sequential development of knowledge, skills and attitudes over time. Continuity is process oriented. The sequence of events may be connected by a theme and supported by follow-up activities.

Feedback refers to on-going appraisal or monitoring of a program. The method of feedback evaluation is determined by the purpose for which it is to be used. In a process orientation to in-service education, feedback is a dynamic procedure used to select and revise strategies to meet the needs of the group.

The case study method was selected as a means of obtaining research data and testing the practicality of an in-service program based on a three phase process approach that included the five categories of variables as important factors to be considered. The case selected was an in-service project to facilitate implementation of a grade four environmental education unit of study. Twenty grade four teachers were involved in four in-service sessions during the last half of the school year.

The value and practicality of the framework used to develop the in-service program were tested in the analysis of the case. The teachers' comments and group discussion recorded throughout the project provided support for interpreting the practical value of the in-service plan. In the final phase, teachers confirmed their intention to continue use of the study unit which was the innovation in this case. They also planned to encourage other teachers to use the unit, thus providing a multiplier effect.

The success of a diffusion project may be judged by whether or not the innovation has been adopted. In this case, the in-service project was considered a success in terms of the 20 teachers involved. All but one who was going on leave intended to implement the unit with their classes again next year.

Conclusions

Results of the Study

The findings of this study provided insight into the nature of designing an in-service program. The conclusions were drawn from the empirical evidence of one case that complemented the ideas drawn from the theoretical literature. The case study method was chosen, rather than the study of single factors, so that the in-service project might be approached from a holistic viewpoint. In such a viewpoint there are many facets to the same subject; that is, there is more than one way to look at it.

The in-service project was viewed as a process for planned change. As a process, three phases of in-service program were designed to accommodate the development from awareness, through understanding, to a commitment for action. The three part conception of in-service programs accommodated the steps in the decision making process of the individual as well as those made collectively as a group. The responses from the participants indicated the progression was appropriate. The program moved from orientation, through understanding and application to confirmation and a commitment to continue using the innovation. Also, there was support from participants to keep the first and last phases of the in-service program brief in proportion to the bulk of the time being spent in the middle phase.

The categories of readiness, participation, relevance, continuity, and feedback were identified as the important factors to consider in the planning, implementation and evaluation throughout

the phases of the in-service project. The responses from the teachers involved and the evidence of their commitment to implementing the innovation indicated a high level of satisfaction was achieved in the in-service process. The operation of the in-service project proved the practicality of using the three phase framework with its five main factors of influence (Table 8).

The readiness factor was accounted for by taking an opportunistic approach; that is, no formalized assessment of readiness was made in this case. Indications of readiness were interpreted from early communication with the teachers and later feedback during the in-service project. As well as maintaining an awareness of readiness, attempts were made to provide encouragement and incentive to developing a greater degree of readiness. In a commercial venture, these efforts would be called promotion. The provision of release time also provided a convenience incentive for teachers.

Methods to provide opportunity for participation included choosing a mutualistic mode of operation. The rating on Blaney's (1974) table of three modes indicated members perceived the method of operation had been 94% shared-membership mode. The teachers also indicated that the mutualistic mode was a preferred method for conducting in-service programs related to teaching strategies.

Judging relevance by its usefulness, it appeared the materials and methods presented during the in-service were applicable to classroom instruction. Many of the teaching ideas were generated collectively. Field techniques presented by the consultant were incorporated

into the teachers' methods of conducting their own students' field investigations.

The provision of resources that allowed the in-service project to be implemented over time was important to planning a developmental sequence of events. The unit topic provided a unifying theme around which to focus a diversity of activities. Attention to the idea of continuity ensured an orientation to process as well as events. It contributed to building the connections between the in-service events, the unit, the teaching methods, and the students' learning. In the words of a participant: "It's all tied together."

The ongoing feedback discussions and sharing circles provided a kind of formative evaluation. For the consultant, this served to assess the relevance of the activities and provided guidance for selecting appropriate strategies or for making program revisions to suit the perceived needs of the group. For the teachers in the group, feedback served to promote cohesiveness of the group. It also served as a review and confirmation of ideas and activities presented.

From the inquiry and the findings of the present study it may be concluded that:

1. When in-service education is intended for professional growth beyond an exposure to new ideas and materials, it is important to view the in-service program as a professional development process, based upon supporting and encouraging the acquisition of new understandings and skills.

2. When viewed as a process, it becomes important to consider a matrix of interrelated variables that influence the appropriateness of in-service techniques and strategies selected, and the effectiveness of the program as a whole.
3. The numerous variables that influence the planning, procedure, and results of the in-service program can best be accounted for by identifying focal points in a framework around which the many variables may be categorized.
4. In this case the useful focal points identified were factors of: readiness, participation, relevance, continuity, and feedback. In this way it became possible to maintain and monitor ongoing considerations of the individual teacher, the group, the greater system, the innovation to be implemented, and the ultimate beneficiaries in the classroom.

Usefulness of the Case Study Approach

The case study approach is ecological in nature; it provides a frame of reference in which 'everything is related to everything else'. In this way the pieces may be viewed in context of the whole; and the events are viewed in terms of their contribution to the process. Further, "the case method is practically mandatory for the student interested in process rather than product" (Olsen, 1949, p. 328).

In-service education is subject to a wide range of views; and by virtue of its complex nature there is no prescribed base of knowledge or set of guidelines to follow that will lead to neatly defined outcomes. In-service education, like environmental education, does not fit into organized limits of any one discipline or subject area. It is very much like the elephant described by the blind men; a viewpoint on what it is depends so much on where the perceiver is.

Briefly then, the case study approach was perceived as being an appropriate method of enquiring into the practice of in-service education and the implications for planning in-service programs. It was recognized that one of the limitations of the case study approach is that conclusions from one case may not be generalized to all cases. However, an understanding of the process in one case provides a base of experience to which further observations may be applied. The case method provided for an in-depth study of an in-service program and proved to be a useful vehicle for testing the framework of the in-service design.

Usefulness of a Framework

The three phase conception of the in-service process (Table 8) and the five categories of variables (Figure 4) provided the framework within which the in-service program was designed and analyzed. The framework represents a synthesis of theory, method, and practice.

The framework, illustrated as a composite model representing a theoretical base, was useful as a simplified abstraction of a complex process. The value of the model was in its usefulness as a ready frame

of reference for considering the many variables and alternatives involved in the in-service program. The categories of readiness, participation, relevance, continuity, and feedback provided focal check points throughout the development of the three phases of the in-service program.

The identification of the five categories and the constructing of the diagram model resulted from an analysis of a wide range of theory and information. Kaplan (1964) distinguished the interpretive model as being a model for a theory, not of a theory (p. 267). The very exercise of identifying the categories and developing a model to represent the theory and the complexity of variables that influence the effectiveness of an in-service program provided insight which may have otherwise been unclear.

The utility of the framework was proven in the development of the in-service project. It provided a useful index for monitoring and revising procedures throughout the program. Although tested in one case, the framework was developed with the intention that its usefulness would extend to further programs of in-service education.

Implications

For In-Service Education

A recurring recommendation that appeared in the literature was the need to involve teachers in the in-service program, to actively participate in the planning and in the practice of in-service sessions. The results of this study seem to indicate teachers are

willing and able to share the responsibility of operating an in-service program. The necessary resources provided in this program were release time and consultant service. The rewards are the development of self-sufficiency and a multiplier effect. The recommendation that teachers participate in the planning of in-service sessions then is not new. It is now made again, in light of the practical evidence provided in this study. It is a first and important step in a participatory approach to in-service education.

Further, the insights gained from the findings of this study support the idea that 'good teachers do not teach--they create exciting learning situations'. This same advice applies to the teacher of teachers, yet there is little opportunity for consultants to develop the knowledge, skills and attitudes for conducting effective in-service sessions for adult colleagues. Successful in-service may often be the result of good luck than of good management. There are many skills needed in order to conduct an effective, ongoing in-service program; and opportunities need to be provided in which such skills may be learned and practised. In other words, leaders like teachers, need opportunities to be involved in in-service programs for leaders. A knowledge of a subject area is not enough. Consultants who conduct or facilitate the development of in-service programs need to know much more about the in-service process and alternative styles of leadership.

Another implication that becomes evident is that even though we do not have well developed patterns for in-service procedure from

which to choose, we are not presently using what is already known. Reviewing current in-service practices, it becomes obvious that many sessions are one-shot events; yet the inadequacies of such isolated events have been proclaimed by various educators. The expectations of in-service education cannot be realized until what knowledge is available has been incorporated into the planning and implementation of in-service programs.

In the study of this case, teachers were involved in thinking and acting in new ways. They in turn structured learning situations for their students in which creativity and cooperation were fostered.

In the words of Commenius: "We learn not for school but for life." The results of this study seem to indicate that the in-service program facilitated the adoption of new ideas by the teachers involved. The theoretical framework for the in-service design included change theory as a base. The implication is that in order to improve education, an understanding of how change is effected and how new ideas are adopted is essential. In-service education provides a means for planning change. However, good intentions must be supported with a good understanding of the process of change. In-service planners need to recognize their own role and that of the in-service program as agents for change.

An implication for the presenter of in-service programs follows from the sessions in this study; that is, it is important to practise what you preach. The idea of teaching by example, of being consistent in actions as well as advice, provides a practical element that bridges the gap between theory and practice. For example, if

teachers are to learn new ways of teaching from an inductive approach, they must first be involved in practising the approach. A lecture only on the inductive approach would be inconsistent with the approach (Taba, 1965, p. 472).

Another important implication realized from this study is the lack of information available on implementing innovative programs. The information that exists tends to be limited to either the invention or the consequence phases of program development. If lack of information reflects a lack of effort, it would be in order to recommend that the effort expended in inventing a program should be dwarfed in comparison to the efforts to implement the innovation. The trite phrase of 'quality versus quantity' may apply here. The assumption is if more energy was placed on implementation, there would be less need for proliferation of programs.

From the foregoing discussion, the following implications regarding in-service education seem to emerge:

1. Teachers need to be consulted in the planning of in-service programs.

2. Teachers should be included in practical applications of ideas presented in the in-service sessions.

3. Providing release time for classroom teachers is an essential incentive to participating in in-service programs.

4. Consultants as in-service planners and presenters need their own in-service education to develop knowledge of what is already known about good in-service education.

5. In-service educators should have planned opportunities for

them to explore alternate methods and leadership styles by which they may facilitate the learning of their adult teacher colleagues.

6. In-service educators need to be aware that teaching by example is an important method to be used.

7. The inadequacies of in-service education as one shot isolated events have been proclaimed. There needs to be more emphasis on in-service programs as an ongoing developmental process of professional development.

8. In order that in-service programs contribute to the improvement of education, an understanding of the change process and the role of agents for change is essential.

9. Much more effort needs to be directed to the implementation phase of program development. The adoption of new ideas may be facilitated by ongoing in-service sessions in an implementation program.

For Further Research

The need for further studies on designing and conducting in-service education have been alluded to in the foregoing outline of implications. In-service education has the reputation of being an unfulfilled promise. In contrast, the results of this study indicated a high level of teacher satisfaction with the in-service program implemented.

What are the key factors that influence the effectiveness of in-service education as a process for planned change? Five key

categories were posed and tested in this study. Further research questions include testing the framework model, exploring any one of the factors, conducting longitudinal studies on the effects of in-service education, and expanding on the leadership role of the consultant.

The framework model. Three questions related to the framework model are:

1. What is the utility of the three phase and five factor categories conception of in-service education when applied to other in-service programs?
2. What refinements would there be to the framework as a result of further testing?
3. What changes in teacher behavior result from using the framework model?

The factors. Questions for exploring the factors are:

1. What is the significance of any one factor?
2. To what extent does the readiness climate determine the adoption of an idea presented?
3. How do the different methods of decision making affect the level of participation of members in a group?
4. What factors determine the value and practicality of using Blaney's (1974) shared membership mode?
5. What is the relationship between teachers' satisfaction and the perceived relevance of material and ideas presented?
6. How do ongoing in-service programs compare to one-time isolated

events in effecting professional development?

7. What are teachers' perceptions of in-service education?

8. What are the strengths and weaknesses of in-service programs as perceived by teachers?

9. What are the short term and long term consequences of an in-service program?

Role of the consultant. Further research may include:

1. How do different leadership styles affect the role of the consultant?

2. What expectations do consultants and supervisors have of in-service education?

3. What is the contribution made by consultants to in-service education?

4. What are the implications for the consultant in the role of the change agent?

Concluding Statement

In this study in-service education was viewed as a process for change. Factors considered important in the design of in-service programs were identified. The framework model that was developed provided a guide for planning and monitoring an in-service program. The program, as described by a participant was:

> ". . . practical and well sequenced. We were involved in doing things; we helped instruct; we applied ideas, practised role playing. We had to think for ourselves and figure things out. You can get more mileage when everyone takes part. That's making use of all the resources."

The intent of the study was to enquire into the practice of in-service education. This study should provide further insight into gaining a clearer perspective of in-service education as most fundamental to the instructional change process. Instructional changes are made by teachers who have a commitment clearly in view. It is assumed that commitment can be aided, whetted, supported, and encouraged by thoughtfully designed in-service opportunities that provide for development of the individual teacher's knowledge, skills and attitudes. This study should provide further insights into designing the kinds of professional development that builds confidence, so when the in-service task is accomplished the teacher may be inspired to say:

> "We have done it ourselves" (Lao-Tze in Henry, 1957, p. 157).

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APPENDIX A

LETTER FROM A PARTICIPANT

June 20, 1977

Mr. Don Vinge
Asst. Superintendant - Curriculum
Edmonton Public School Board
Edmonton, Alberta

Dear Mr. Vinge:

I would like to express my appreciation for the opportunity to participate in two full days of inservice with Joy Finlay. The topic of these inservices was implementation of the new grade four environmental education unit, focusing on waste resources.

Had I not been able to attend these inservices during release time, I do not believe I could have as effectively shared the materials and concepts contained in the unit with my students. In particular, the workshops, held primarily outside, helped me bridge the gap between the garbage in our classroom and the litter on the forest floor. I gained immeasurably from the continuity with a small group, and from the skill and enthusiasm of the group facilitator, Joy Finlay. My students, in turn, gained from my new interest and focus. All in all, it seemed a good example of group ecology.

I hope I can share with other teachers a portion of what I have received.

Sincerely,

Dianne Linden

Dianne Linden
Caraway Program -
Garneau School

cc: Joy Finlay
Keith Molyneux

APPENDIX B

SAMPLES OF STUDENT MATERIAL PREPARED BY TEACHERS

HOW OLD IS IT?

1. Find the oldest thing. What is it?

2. Compare it with others "oldest thing".

3. Do you still think that yours is the oldest thing? -- Why or why not?

4. Now find the newest thing. Describe it.

5. Compare it with someone else's newest thing.

6. Do you still think that yours is the newest -- Why or why not?

7. When is old "new" and when is new "old"?

4

LITTER ON THE FOREST FLOOR

Litter, composed of bits of wood, bark, leaves, and tiny animal remains, decomposes and becomes organic soil. The presence of decomposing organic matter is a sign that soil making is underway.

Activity: To discover what can be found on the surface of a small plot of ground.

1. Is it all dead material? _____
2. Is there live material? _____
3. Notice the leaves--are they all the same kind? _____
4. Are some leaves more decomposed than others? _____
5. Find different stages of decomposition. How many did you find? ____
6. Make a leaf puzzle by fitting pieces of leaves together to form a whole leaf shape.

Activity:

- Find an object on the ground that appears to have come from elsewhere. Try to discover from where and how it got where it was found.

Activity:

- What building materials can you find that a bird would use for nest building?

Activity:

- Look at trees and compare how they are the same; how they are different.

Activity:

- Find something used. Describe it. How is it being used?

Activity:

- Find something new - the newest thing you can find around you.
- How new is it? Why did you choose it?

Activity:

- What can you see on the ground directly in front of you? Is it something that grew there naturally or did it come from some other setting? Can you decide where the foreign object may have come from? How do you know?

Activity:

- Find something old - the oldest thing you can find around you.
- How do you know it is old? What made you choose it?

Activity:

- Scavenger Hunt - find an example of each of the following words. Be able to talk about it.

(1) Biodegradable
(2) Compost
(3) Decomposition
(4) Photosynthesis
(5) Moss
(6) Non-biodegradable
(7) Oxygen-Carbon Dioxide Cycle
(8) Food Chain
(9) A home or shelter in nature
(10) Decay

Activity:

- Find and observe two living things that help each other. How do they help each other? What would happen if one of them disappeared?

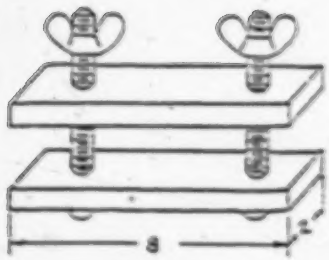
Get Them All - Good Luck!!

APPENDIX C

SAMPLE OF RESOURCE MATERIAL PROVIDED FOR TEACHERS

PAPER PADDING

1. PRESS



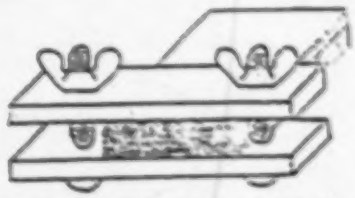
Materials:

2 pieces, 3/4" x 2 " x 9" hardwood
2 carriage bolts, full thread ¼" x 4"
2 wing nuts and washers

Construction:

1. Cut and sand the two blocks to size.
2. Locate the holes to be drilled 1" from each end.
3. Clamp the two blocks together and drill a 5/16" hole at the points located. Clamping ensures that holes in both pieces will be properly aligned.
4. Insert the carriage bolts into the bottom piece and set the square shank of the bolt by tapping with a hammer.
5. Complete assembly as in the diagram.

2. PADDING



Concept: Paper printed on one side can be recycled into a useful product.

Integration: Social Studies - paper making, recycling.

Materials:

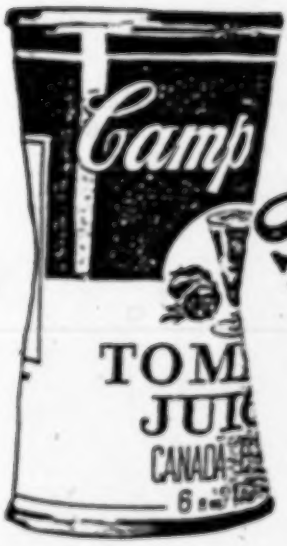
Padding press
Padding compound or rubber cement (Lepage Padding Compound can be purchased from Can-Tech School Equipment and Supplies Ltd., 22 Airport RD., Edmonton.)
Assorted paper, blank on one side
Rubber stamps (student constructed)
Scissors or shears (with a guard)
Brush

Procedure:

1. Cut the paper to one size, e.g. 8-½" x 11" letterhead cuts into four equal parts, 4-¼" x 5-½".
2. Sort all the cut sheets to face blank side up.
3. Imprint a design of your choice on each page.
4. Select your own method of printing, e.g. rubber stamp, silk screen, potato printing.
   Use a piece of card stock as top and bottom covers. Stack the sheets neatly and insert into the padding press.
5. Tighten the wing nuts.
6. Brush on the padding cement. Start at the center and work towards the outside edges. Put on a second coat when dry.
7. Clean up the scrap paper and wash the brush in water while waiting for the pad to dry.

APPENDIX D

A SAMPLER OF "SOMETHING FROM NOTHING"



EDMONTON PUBLIC SCHOOLS

SOMETHING FROM NOTHING

A Grade Four
Environmental
Education Unit
Focusing On
Waste Resources

MAJOR GENERALIZATIONS AND OBJECTIVES

I. Waste products are continually being produced

Objectives

A. Identify and classify waste materials found in students' desks.

B. Identify, weigh, and compare items of waste found in the classroom.

C. Construct a graph using data collected.

D. Analyze - to make inferences concerning waste made by various grades.

E. Identify and classify types of waste.

F. Construct a class chart to illustrate the types of waste found.

G. Recognize that certain categories of material are discarded more often than others.

II. Waste products can be re-used

A. Develop listening and comprehension skills.

B. Identify ways in which man reuses his wastes.

C. Demonstrate re-cycling of paper.

D. Distinguish between the terms "re-cycle" and "re-use".

E. Identify ways in which nature re-cycles its waste.

F. Distinguish between end products of nature's and man's waste.

G. Recognize the fact that nature re-uses or re-cycles all of its waste products.

H. Demonstrate a knowledge of new terminology.

I. Demonstrate biodegradability of a number of man-made and natural products.

III. Everyone in our school has a responsibility to re-use waste products

A. Describe ways in which students can be good re-cyclers.

B. Identify contributions being made by students.

C. Develop awareness of re-cycling activities in our own city.

D. Construct and display posters to influence others towards positive waste removal practices.

E. Construct letters to influence others towards positive waste removal practices.

F. Plan an anti-litter campaign.

G. Clarify issues with regards to waste disposal.

H. Conduct a survey to determine the quantity of waste accumulated at home.

I. Analyze results of survey.

J. Acquire, organize, and evaluate information from guest speaker.

IV. Everyone in our neighbourhood has a responsibility to re-use waste products

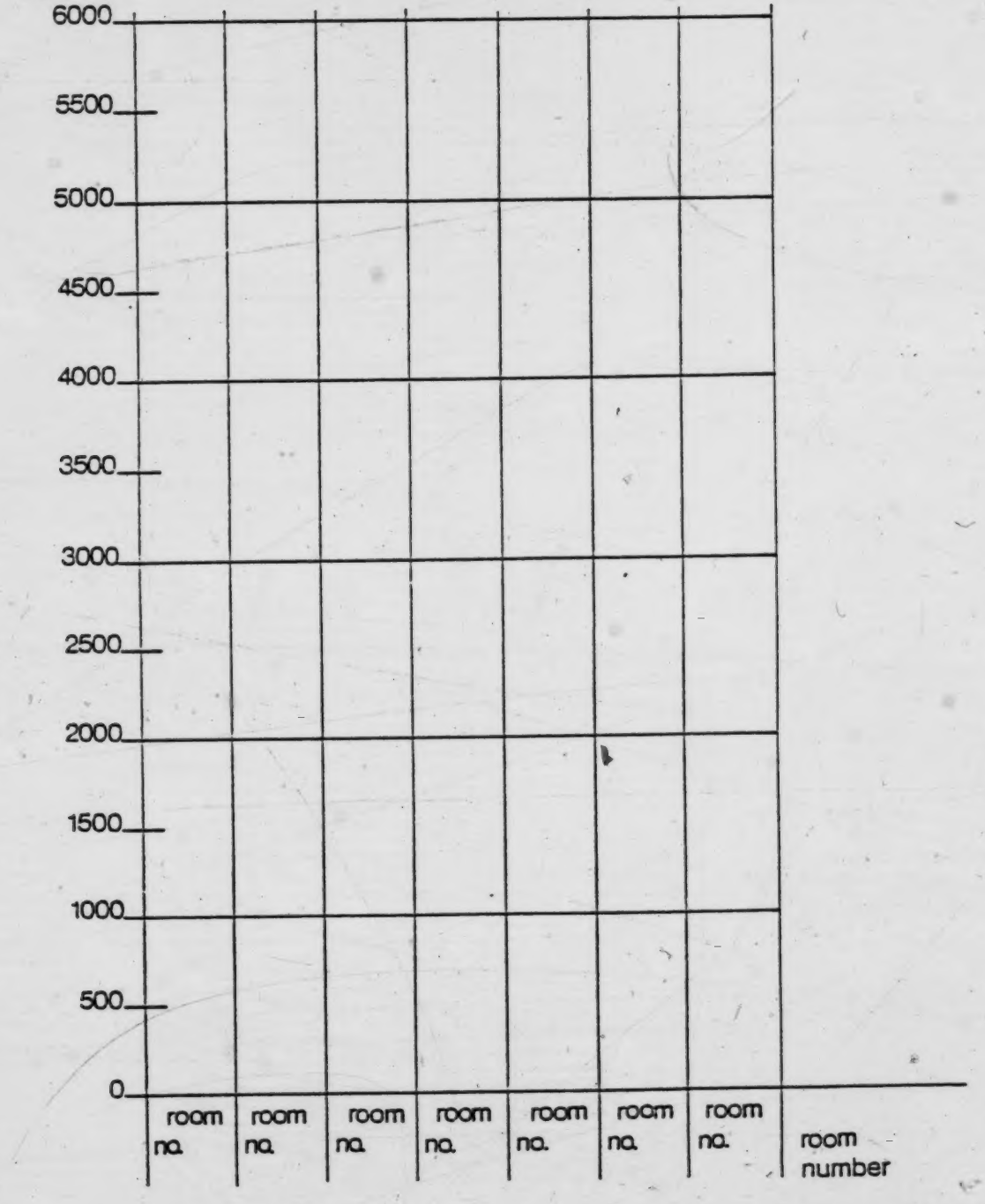
A. List waste products produced in neighbourhood.

B. Plan a waste survey for groups in the neighbourhood.

C. Construct maps to show location of nearby bottle depots and paper salvage companies.

D. Construct a cartoon strip to illustrate changes that have occurred throughout the unit.

WASTE SURVEY SHEET



3. How much waste can we find around our school?

(a) Have students collect waste from the school grounds, a nearby park or back alley. Which group can collect the largest mass of waste?

(b) Have students weigh bags and record totals. Award "Garbage Collector's Badges".

Discuss the following questions:

i. What types of waste did each group find? Use the following check list:

METALS	GLASS	PAPER	RUBBER	PLASTICS	CLOTHING

ii. What kind of waste was found most often?

iii. Who do you think put it there? Why?

(c) Have each group use materials collected to construct a "Garbageman" or a collage with a story or poem for explanation.

APPENDIX E

EXAMPLES OF MEMOS TO TEACHERS

EDMONTON PUBLIC SCHOOL BOARD

10010 - 107A Avenue
Edmonton, Alberta.
T5H 0Z8

Outdoor Environmental Education
Curriculum Department

Date: November 22, 1976

MEMORANDUM

To : Grade IV Teachers

From : Joy Finlay, Consultant & Teacher, Hazeldean School

Subject: Environmental Education Unit "Something From Nothing"

The revised unit is being printed and will be available for implementing in the new year. This note is being sent to the twenty-five teachers who have indicated interest in the unit, including some who were involved as pilot testing teachers last year.

The unit theme is on waste resources. The approach is integrative and practical, involving students in studies in school, yard, and community.

Implementing teachers will be involved in one or two workshops to share ideas about this unit, identify teaching resources and strategies, and perhaps, visit a field site in preparation for a class study there.

It is important that you confirm your interest in implementing this unit as soon as possible, so that you will have an opportunity to express your thoughts about ways for implementing this unit.

Please phone me at Hazeldean, 439-0868, or Linda Larson, secretary, Outdoor Environmental Education, 429-5621, Extension 307. The unit material will then be forwarded to implementing teachers.

If you know of other grade IV teachers who may be interested, please refer them to me. I look forward to hearing from you again.

JF/ll

EDMONTON PUBLIC SCHOOL BOARD

10010 - 107A Avenue
Edmonton, Alberta.
T5H 0Z8

Outdoor Environmental Education
Curriculum Department

Date: June 23, 1977

MEMORANDUM

To : Grade Four Implementing Teachers

From : Joy Finlay, Consultant and Teacher, Hazeldean School

Subject: Environmental Education Unit on Solid Waste

I will continue to share further tips, techniques and reference material with you as it becomes available to us. Some excellent ideas have been sent in by several teachers, and some more are yet to come. With some help already volunteered we willattempt to compile a resource package of selected materials of proven and potential usefulness.

Thank you for your help this year and for your interest in facilitating further implementation next year.

Have a good summer and keep in touch!

JF/ll
Encl.

APPENDIX F

AN UNEDITED EXCERPT FROM THE SUMMARY SESSION TAPES

An Unedited Excerpt From the Summary Session Tapes

Doug: As far as the unit went, I sort of, I didn't go through it as one unit. I sort of just used it in different ways. Instead of doing it in a block I sort of did it kind of throughout. Like I did a bit in the winter when I first got it and quite a bit more in spring. I'd like to start in the fall next year, rather than taking it as a whole. I found that it was an integrated unit. I couldn't do it just as one kind of unit. I had so many science units and everything else, I thought it was best to fit this in where it fit. I found it really worked well.

Ken: I went right through it. Next time I might scatter it a bit too -- make it part of the whole year. I'm going to start in the fall next year -- do some in the winter and in the spring.

Clara: The second time through it, you'd be more conscious of where to fit it in -- know the word lists and this kind of thing that you'd be developing in language arts, I think too. I used word lists in writing classes too.

Trudy: And we did our words on the bus bingo. It was really interesting to put words together with observation. We had six columns. We brainstormed in class, like we did in the in-service, to get the columns. It was a write-in bingo.

I found the parents that helped me on that day trip really were as keen as we were. One of them happened to be the chairman of our local advisory committee. And she brought it up at our last meeting that the whole school should go on enviromental education. And we'd been thinking as a staff what a good idea it was to work from a theme. We'd been kind of thinking of working environmental themes next year. And the whole school would work on them next year. They're really excited about it. And the parents are too, 'cause I'd showed them the book and some things we did at our in-service; and the things we wrote up, before they came along with us. And we were thinking we might do our professional development days with kind of a sharing thing. We'd each take something we've tried with our kids, or want to get some ideas about, then do it with the other teachers. I guess there must be experts we could get to show us how. Like you could have showed us how to teach it, instead of helping us discover for ourselves. But it would be kind of interesting to see what we could do for ourselves too. And the parents might help too.

It's too bad we can't publicize this so more people could find out about it. It's really great, especially for a small school like ours.

Bonnie: I found in my class we really get into some good debates on the kinds of questions that were brought up from the unit. If anything, that's when my kids really started thinking, from the different ideas that were brought up in the discussion. They really seemed to think about things. They were really questionning each other and thinking about what we're doing and what we could be doing. Course I've sure got thinking about things too since I started this program. And I think its been a great help to get out and think with a group like this too. It's really been good; the unit; the in-service; everything was. Every teacher should have this chance.

Consultant: Every teacher should have this chance? You have some good ideas.

Clara: Yah, there should be system wide in-service so every teacher gets the unit book.

But people don't want a lot of theory. They want to have this (the unit) in front of them and they want to go through it and ask questions . . .

Chester: That's right! They want to get in there and mess around, they don't want to just sit there and have it all come one way.

Larry: I think it's got to be useful to the kids.

Helen: It's also a bit degrading if you have to have someone tell you what you can just read about.

Art: Well, I think for me it was a matter of getting involved. in our first session I didn't have the faintest idea what was going on or what it was about. It was completely a brand new ball game to me. We came here and we talked about it for a while and then we actually messed around with it, did things; and it sort of peaked my attention. And that all day with us was, you know, a really good deal for how to approach it with the children.

Clara: We had samples of homemade equipment. We saw what we could do. And we were right involved.

Cheryl: You know what would be neat is to have some of the teachers who've been working in the unit go out and work with a small group of those other teachers to help them get started.